

=> file reg

FILE 'REGISTRY' ENTERED AT 13:19:57 ON 30 JAN 2004
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=> display history full l1-

FILE 'REGISTRY' ENTERED AT 12:49:11 ON 30 JAN 2004

E NITROGEN TRIFLUORIDE/CN

- L1 1 SEA "NITROGEN TRIFLUORIDE"/CN
E FLUORINE/CN
- L2 1 SEA FLUORINE/CN
E HYDROGEN FLUORIDE/CN
- L3 1 SEA "HYDROGEN FLUORIDE"/CN
E UREA/CN
- L4 1 SEA UREA/CN

FILE 'HCA' ENTERED AT 12:53:24 ON 30 JAN 2004

- L5 4572 SEA L1 OR (NITROGEN# OR N) (W) (FLUORIDE# OR TRIFLUORIDE#)
OR NF3 OR F3N

FILE 'LCA' ENTERED AT 12:53:28 ON 30 JAN 2004

- L6 226 SEA L2 OR F2 OR (FLUORINE# OR F) (2A) (GAS## OR GASEOUS?
OR GASIF? OR ATM# OR ATMOS? OR APPLY? OR APPLIED OR
APPLICATION? OR INTRODUC? OR INJECT? OR SYRING? OR
NEEDL? OR NOZZL? OR JET OR JETS OR PORT OR PORTS OR
PORTAL? OR STREAM? OR FLOW OR FLOWS OR FLOWED OR
FLOWING# OR TREAT? OR PROCESS?)

FILE 'HCA' ENTERED AT 12:59:46 ON 30 JAN 2004

- L7 92046 SEA L2 OR F2 OR (FLUORINE# OR F) (2A) (GAS## OR GASEOUS?
OR GASIF? OR ATM# OR ATMOS? OR APPLY? OR APPLIED OR
APPLICATION? OR INTRODUC? OR INJECT? OR SYRING? OR
NEEDL? OR NOZZL? OR JET OR JETS OR PORT OR PORTS OR
PORTAL? OR STREAM? OR FLOW OR FLOWS OR FLOWED OR
FLOWING# OR TREAT? OR PROCESS?)
- L8 119652 SEA L3 OR HYDROGEN#(W) FLUORIDE# OR HF
- L9 196214 SEA L4 OR UREA#
- L10 327 SEA L5 AND L7 AND L8
- L11 6 SEA L10 AND L9
- L12 3654 SEA L8(2A) (ANH# OR ANHYD? OR DRY? OR DRIED OR DESSICAT?
OR DESICAT? OR DESICCAT? OR DESSICCAT?)
- L13 17 SEA L10 AND L12

FILE 'LCA' ENTERED AT 13:08:24 ON 30 JAN 2004

L14 32135 SEA (PRODUC? OR PROD# OR GENERAT? OR MANUF? OR MFR# OR
CREAT? OR FORM## OR FORMING# OR FORMAT? OR MAKE# OR
MADE# OR MAKING# OR FABRICAT? OR SYNTHESI? OR PREPAR? OR
PREP#)/BI,AB

FILE 'HCA' ENTERED AT 13:08:55 ON 30 JAN 2004

L15 887 SEA L14(3A)(L1 OR L5)
L16 240 SEA L1/P
L17 87 SEA L10 AND (L15 OR L16)
L18 3277 SEA L1
L19 41038 SEA L2
L20 35869 SEA L3
L21 74 SEA L17 AND L18
L22 60 SEA L17 AND L19
L23 59 SEA L17 AND L20
L24 15 SEA L13 NOT L11
L25 44 SEA L21 AND L22 AND L23
L26 43 SEA L25 NOT (L11 OR L24)
L27 31 SEA (L21 OR L22 OR L23) NOT (L11 OR L24 OR L26)
L28 6 SEA L17 NOT (L11 OR L24 OR L26 OR L27)
L29 6 SEA L11 AND (1907-2001/PRY OR 1907-2001/PY)
L30 15 SEA L24 AND (1907-2001/PRY OR 1907-2001/PY)
L31 42 SEA L26 AND (1907-2001/PRY OR 1907-2001/PY)
L32 26 SEA L27 AND (1907-2001/PRY OR 1907-2001/PY)
L33 6 SEA L28 AND (1907-2001/PRY OR 1907-2001/PY)

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FILE 'HCA' ENTERED AT 13:21:11 ON 30 JAN 2004

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L29 ANSWER 1 OF 6 HCA COPYRIGHT 2004 ACS on STN

138:139598 Method for manufacture of **nitrogen**

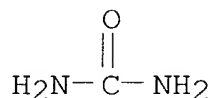
trifluoride. Igumnov, S. M.; Kharitonov, V. P. (Zakrytoe
Aktsionernoe Obshchestvo Nauchno-Proizvodstvennoe Ob'edinenie
"PiM-Invest", Russia). Russ. RU 2184698 C1 20020710, No pp. given
(Russian). CODEN: RUXXE7. APPLICATION: RU 2001-112703 20010508.

AB New method for the manuf. of **nitrogen trifluoride**

suitable for use in semiconductor device fabrication is described.
The method includes fluorination of carbamide or products of its
decompn. by fluorine in anhyd. **hydrogen fluoride**
at -20.degree.-0.degree. and fluorine to initial compds. molar ratio
of .ltoreq.3. Concn. of initial compds. in anhyd. fluorine is 20-50

wt.%. The method is explosion-proof and allows to produce product with max. content of **nitrogen trifluoride** and minimal concn. of impurities with yield up to 90%.

IT 57-13-6, Carbamide, processes 7664-39-3,
Hydrogen fluoride, processes 7782-41-4,
Fluorine, processes
 (method for manuf. of **nitrogen trifluoride**
 suitable for use i.m. semiconductor device fabrication)
 RN 57-13-6 HCA
 CN Urea (8CI, 9CI) (CA INDEX NAME)



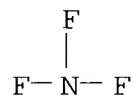
RN 7664-39-3 HCA
 CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IT 7783-54-2P, **Nitrogen trifluoride**
 (method for manuf. of **nitrogen trifluoride**
 suitable for use i.m. semiconductor device fabrication)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C01B021-083
 CC 49-5 (Industrial Inorganic Chemicals)
 Section cross-reference(s): 76
 ST **nitrogen trifluoride** manuf
 IT Semiconductor device fabrication
 (method for manuf. of **nitrogen trifluoride**
 suitable for use i.m. semiconductor device fabrication)
 IT 57-13-6, Carbamide, processes 7664-39-3,
Hydrogen fluoride, processes 7782-41-4,

Fluorine, processes

(method for manuf. of **nitrogen trifluoride**
suitable for use i.m. semiconductor device fabrication)

IT 7783-54-2P, **Nitrogen trifluoride**
(method for manuf. of **nitrogen trifluoride**
suitable for use i.m. semiconductor device fabrication)

L29 ANSWER 2 OF 6 HCA COPYRIGHT 2004 ACS on STN

116:135528 Performance-oriented packaging standards; changes to classification, hazard communication, packaging and handling requirements based on UN standards and agency initiative. (United States Dept. of Transportation, Washington, DC, 20590-0001, USA). Federal Register, 55(246), 52402-729 (English) 21 Dec 1990. CODEN: FEREAC. ISSN: 0097-6326.

AB The hazardous materials regulations under the Federal Hazardous Materials Transportation Act are revised based on the United Nations recommendations on the transport of dangerous goods. The regulations cover the classification of materials, packaging requirements, and package marking, labeling, and shipping documentation, as well as transportation modes and handling, and incident reporting. Performance-oriented stds. are adopted for packaging for bulk and nonbulk transportation, and SI units of measurement generally replace US customary units. Hazardous material descriptions and proper shipping names are tabulated together with hazard class, identification nos., packing group, label required, special provisions, packaging authorizations, quantity limitations, and vessel stowage requirements.

IT 7664-39-3, **Hydrogen fluoride**,
miscellaneous 7782-41-4, **Fluorine**, miscellaneous
7783-54-2, **Nitrogen trifluoride**
(packaging and transport of, stds. for)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

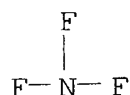
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 59-6 (Air Pollution and Industrial Hygiene)

IT 1305-79-9, Calcium peroxide 1305-99-3, Calcium phosphide
 1309-60-0, Lead dioxide 1310-58-3, Potassium hydroxide,
 miscellaneous 1310-65-2, Lithium hydroxide 1310-73-2, Sodium
 hydroxide, miscellaneous 1310-82-3, Rubidium hydroxide
 1312-73-8, Potassium sulfide 1313-60-6, Sodium peroxide
 1313-82-2, Sodium sulfide, miscellaneous 1314-18-7, Strontium
 peroxide 1314-22-3, Zinc peroxide 1314-24-5, Phosphorus trioxide
 1314-34-7, Vanadium trioxide 1314-56-3, Phosphorus pentoxide,
 miscellaneous 1314-62-1, Vanadium pentoxide, miscellaneous
 1314-80-3, Phosphorus sulfide (P₂S₅) 1314-84-7, Zinc phosphide
 1314-85-8, Phosphorus sesquisulfide 1319-77-3, Cresylic acid
 1320-37-2, Dichlorotetrafluoroethane 1321-10-4, Chlorocresol
 1321-31-9, Phenetidine 1327-53-3, Arsenic trioxide 1330-20-7,
 Xylene, miscellaneous 1330-45-6, Chlorotrifluoroethane
 1330-78-5, Tricresyl phosphate 1331-22-2, Methyl cyclohexanone
 1332-12-3, Fulminating gold 1332-37-2, Iron oxide, properties
 1333-39-7, Phenolsulfonic acid 1333-41-1, Picoline 1333-74-0,
 Hydrogen, miscellaneous 1333-82-0, Chromium trioxide 1333-83-1,
 Sodium **hydrogen fluoride** 1335-26-8, Magnesium
 peroxide 1335-31-5, Mercury oxycyanide 1335-85-9,
 Dinitro-o-cresol 1336-21-6, Ammonium hydroxide 1337-81-1
 1338-23-4, Methyl ethyl ketone peroxide 1341-24-8,
 Chloroacetophenone 1341-49-7, Ammonium **hydrogen**
fluoride 1344-40-7, Lead phosphite, dibasic 1344-67-8,
 Copper chloride 1498-40-4, Ethyl phosphonous dichloride
 1498-51-7, Ethyl phosphorodichloridate 1569-69-3, Cyclohexyl
 mercaptan 1609-86-5, tert-Butyl isocyanate 1623-15-0
 1623-24-1, Isopropyl acid phosphate 1634-04-4, Methyl-tert-butyl
 ether 1693-71-6, Triallyl borate 1705-60-8, 2,2-Di(4,4-di-tert-
 butylperoxycyclohexyl)propane 1712-64-7, Isopropyl nitrate
 1719-53-5, Diethyldichlorosilane 1737-93-5, 3,5-Dichloro-2,4,6-
 trifluoropyridine 1789-58-8, Ethyldichlorosilane 1795-48-8,
 Isopropyl isocyanate 1838-59-1, Allyl formate 1873-29-6,
 Isobutyl isocyanate 1885-14-9, Phenylchloroformate 1947-27-9,
 Arsenic trichloride 2050-92-2, Di-n-amylamine 2094-98-6,
 1,1'-Azodi(hexahydrobenzonitrile) 2144-45-8, Dibenzyl
 peroxydicarbonate 2155-71-7 2167-23-9, 2,2-Di(tert-
 butylperoxy)butane 2217-06-3, Dipicryl sulfide 2243-94-9,
 1,3,5-Trinitronaphthalene 2244-21-5, Potassium
 dichloroisocyanurate 2294-47-5, p-Diazidobenzene 2312-76-7
 2338-12-7, 5-Nitrobenzotriazole 2487-90-3, Trimethoxysilane

2508-19-2, Trinitrobenzenesulfonic acid 2524-03-0, Dimethyl
chlorothiophosphate 2524-04-1, Diethylthiophosphoryl chloride
2549-51-1, Vinyl chloroacetate 2551-62-4, Sulfur hexafluoride
2567-83-1, Tetraethylammonium perchlorate 2657-00-3, Sodium
2-diazo-1-naphthol-5-sulfonate 2691-41-0,
Cyclotetramethylenetetranitramine 2696-92-6, Nitrosyl chloride
2699-79-8, Sulfuryl fluoride 2782-57-2, Dichloroisocyanuric acid
2782-57-2D, Dichloroisocyanuric acid, salts 2820-51-1, Nicotine
hydrochloride 2825-15-2 2855-13-2, Isophoronediamine
2867-47-2, Dimethylaminoethyl methacrylate 2893-78-9, Sodium
dichloroisocyanurate 2937-50-0, Allyl chloroformate 2941-64-2,
Ethyl chlorothioformate 2980-64-5 3025-88-5,
2,5-Dimethyl-2,5-dihydroperoxy hexane 3031-74-1, Ethyl
hydroperoxide 3032-55-1 3054-95-3, 3,3-Diethoxypropene
3087-37-4, Tetrapropylorthotitanate 3129-90-6, Isothiocyanic acid
3129-91-7, Dicyclohexylammonium nitrite 3132-64-7, Epibromohydrin
3165-93-3, 4-Chloro-o-toluidine hydrochloride 3173-53-3,
Cyclohexyl isocyanate 3179-56-4, Acetyl cyclohexanesulfonyl
peroxide 3188-13-4, Chloromethyl ethyl ether 3248-28-0,
Dipropionyl peroxide 3268-49-3 3275-73-8, Nicotine tartrate
3282-30-2, Trimethylacetyl chloride 3497-00-5, Phenyl phosphorus
thiodichloride 3689-24-5 3724-65-0, Crotonic acid 3811-04-9,
Potassium chlorate 3926-62-3, Sodium chloroacetate 3982-91-0,
Thiophosphoryl chloride 4016-11-9, 1,2-Epoxy-3-ethoxypropane
4098-71-9 4109-96-0, Dichlorosilane 4170-30-3, Crotonaldehyde
4300-97-4 4316-42-1, N-n-Butylimidazole 4419-11-8,
2,2'-Azodi(2,4-dimethylvaleronitrile) 4421-50-5 4435-53-4,
Butoxyl 4452-58-8, Sodium percarbonate 4472-06-4,
Carbonazidodithioic acid 4484-72-4, Dodecyltrichlorosilane
4528-34-1 4547-70-0 4591-46-2 4682-03-5, Diazodinitrophenol
4795-29-3, Tetrahydrofurfurylamine 4904-61-4, 1,5,9-
Cyclododecatriene 5283-66-9, Octyltrichlorosilane 5283-67-0,
Nonyltrichlorosilane 5329-14-6, Sulfamic acid 5419-55-6,
Triisopropyl borate 5610-59-3, Silver fulminate 5637-83-2,
Cyanuric triazide 5653-21-4 5894-60-0, Hexadecyltrichlorosilane
5970-32-1, Mercury salicylate 6023-29-6 6275-02-1 6423-43-4
6427-21-0, Methoxymethyl isocyanate 6484-52-2, Nitric acid
ammonium salt, properties 6484-52-2D, Ammonium nitrate, mixts.
with fuel oils 6505-86-8, Nicotine sulfate 6659-60-5,
1,2,4-Butanetriol trinitrate 6842-15-5, Propylene tetramer
7304-92-9 7332-16-3, Inositol hexanitrate 7429-90-5, Aluminum,
miscellaneous 7429-90-5D, Aluminum, alkyl derivs. 7439-90-9,
Krypton, miscellaneous 7439-92-1D, Lead, compds. 7439-93-2,
Lithium, miscellaneous 7439-93-2D, Lithium, alkyl derivs.
7439-95-4, Magnesium, miscellaneous 7439-95-4D, Magnesium, alkyl
derivs. 7439-97-6, Mercury, miscellaneous 7439-97-6D, Mercury,
compds. 7440-01-9, Neon, miscellaneous 7440-09-7, Potassium,
miscellaneous 7440-17-7, Rubidium, miscellaneous 7440-21-3,

Silicon, miscellaneous 7440-23-5, Sodium, miscellaneous
7440-28-0D, Thallium, compds. 7440-29-1, Thorium, miscellaneous
7440-31-5D, Tin, org. compds. 7440-32-6, Titanium, properties
7440-36-0, Antimony, miscellaneous 7440-36-0D, Antimony, inorg.
and org. compds. 7440-37-1, Argon, miscellaneous 7440-38-2,
Arsenic, miscellaneous 7440-39-3, Barium, miscellaneous
7440-39-3D, Barium, alloys 7440-39-3D, Barium, compds.
7440-41-7, Beryllium, miscellaneous 7440-41-7D, Beryllium, compds.
7440-43-9D, Cadmium, compds. 7440-44-0, Carbon, miscellaneous
7440-45-1, Cerium, miscellaneous 7440-46-2, Cesium, miscellaneous
7440-55-3, Gallium, miscellaneous 7440-58-6, Hafnium,
miscellaneous 7440-59-7, Helium, miscellaneous 7440-61-1,
Uranium, miscellaneous 7440-63-3, Xenon, miscellaneous
7440-66-6, Zinc, miscellaneous 7440-67-7, Zirconium, miscellaneous
7440-70-2, Calcium, miscellaneous 7440-70-2D, Calcium, alloys
7446-09-5, Sulfur dioxide, miscellaneous 7446-11-9, Sulfur
trioxide, miscellaneous 7446-14-2, Lead sulfate 7446-18-6,
Thallium sulfate 7446-70-0, Aluminum chloride (AlCl₃),
miscellaneous 7487-94-7, Mercuric chloride, miscellaneous
7488-56-4, Selenium disulfide 7521-80-4, Butyltrichlorosilane
7550-45-0, Titanium tetrachloride, miscellaneous 7570-26-5,
1,2-Dinitroethane 7572-29-4, Dichloroacetylene 7578-36-1
7580-67-8, Lithium hydride 7601-89-0, Sodium perchlorate
7601-90-3, Perchloric acid, miscellaneous 7616-94-6, Perchloryl
fluoride 7631-89-2, Sodium arsenate 7631-99-4, Sodium nitrate,
miscellaneous 7632-00-0, Sodium nitrite 7632-51-1, Vanadium
tetrachloride 7637-07-2, Boron trifluoride, miscellaneous
7645-25-2, Lead arsenate 7646-69-7, Sodium hydride 7646-78-8,
Stannic chloride, miscellaneous 7646-85-7, Zinc chloride,
miscellaneous 7646-93-7, Potassium hydrogen sulfate 7647-01-0,
Hydrogen chloride, miscellaneous 7647-18-9, Antimony pentachloride
7647-19-0, Phosphorus pentafluoride 7664-38-2, Phosphoric acid,
miscellaneous 7664-38-2D, Phosphoric acid, esters
7664-39-3, Hydrogen fluoride,
miscellaneous 7664-41-7, Ammonia, miscellaneous 7664-93-9,
Sulfuric acid, miscellaneous 7681-38-1, Sodium hydrogen sulfate
7681-49-4, Sodium fluoride, miscellaneous 7681-52-9, Sodium
hypochlorite 7697-37-2, Nitric acid, miscellaneous 7704-34-9,
Sulfur, miscellaneous 7705-07-9D, Titanium trichloride, mixts.
7705-08-0, Ferric chloride, miscellaneous 7718-98-1, Vanadium
trichloride 7719-09-7, Thionyl chloride 7719-12-2, Phosphorus
trichloride 7722-64-7, Potassium permanganate
(packaging and transport of, stds. for)
IT 7722-84-1, Hydrogen peroxide (H₂O₂), miscellaneous 7723-14-0,
Phosphorus, miscellaneous 7726-95-6, Bromine, miscellaneous
7727-15-3, Aluminum bromide 7727-18-6, Vanadium oxytrichloride
7727-21-1, Potassium persulfate 7727-37-9, Nitrogen, miscellaneous
7727-37-9D, Nitrogen, mixts. with rare gases 7727-54-0, Ammonium

persulfate 7738-94-5, Chromic acid (H_2CrO_4) 7756-94-7,
Triisobutylene 7757-79-1, Potassium nitrate, miscellaneous
7758-01-2, Potassium bromate 7758-09-0, Potassium nitrite
7758-19-2, Sodium chlorite 7758-94-3, Ferrous chloride
7761-88-8, Silver nitrate, miscellaneous 7773-03-7, Potassium
bisulfite 7775-09-9, Sodium chlorate 7775-14-6, Sodium
dithionite 7778-39-4, Arsenic acid 7778-44-1, Calcium arsenate
7778-54-3, Calcium hypochlorite 7778-66-7 7778-74-7, Potassium
perchlorate 7779-86-4, Zinc dithionite 7779-88-6, Zinc nitrate
7782-39-0, Deuterium, miscellaneous 7782-41-4, Fluorine,
miscellaneous 7782-44-7, Oxygen, miscellaneous 7782-44-7D,
Oxygen, mixts. with rare gases 7782-49-2, Selenium, miscellaneous
7782-50-5, Chlorine, miscellaneous 7782-65-2, Germane 7782-78-7,
Nitrosylsulfuric acid 7782-79-8D, Hydrazoic acid, copper complexes
7782-99-2, Sulfurous acid, miscellaneous 7783-06-4, Hydrogen
sulfide, miscellaneous 7783-07-5, Hydrogen selenide (H_2Se)
7783-08-6, Selenic acid 7783-33-7 7783-41-7, Oxygen difluoride
7783-54-2, Nitrogen trifluoride
7783-56-4, Antimony trifluoride 7783-60-0, Sulfur tetrafluoride
7783-61-1, Silicon tetrafluoride 7783-66-6, Iodine pentafluoride
7783-70-2, Antimony pentafluoride 7783-79-1, Selenium hexafluoride
7783-80-4, Tellurium hexafluoride 7783-81-5, Uranium hexafluoride
7783-82-6, Tungsten hexafluoride 7783-91-7, Silver chlorite
7784-08-9 7784-21-6, Aluminum hydride 7784-30-7, Aluminum
phosphate 7784-42-1, Arsine 7784-46-5, Sodium arsenite
7786-30-3D, Magnesium chloride (MgCl_2), mixt. with chlorates
7787-36-2, Barium permanganate 7787-41-9, Barium selenate
7787-71-5, Bromine trifluoride 7788-97-8, Chromic fluoride
7789-09-5, Ammonium dichromate 7789-18-6, Cesium nitrate
7789-21-1, Fluorosulfonic acid 7789-23-3, Potassium fluoride
7789-29-9, Potassium bifluoride 7789-30-2, Bromine pentafluoride
7789-38-0, Sodium bromate 7789-59-5, Phosphorus oxybromide
7789-60-8, Phosphorus tribromide 7789-61-9, Antimony tribromide
7789-69-7, Phosphorus pentabromide 7789-78-8, Calcium hydride
7790-59-2 7790-69-4, Lithium nitrate 7790-91-2, Chlorine
trifluoride 7790-93-4, Chloric acid 7790-94-5, Chlorosulfonic
acid 7790-98-9, Ammonium perchlorate 7790-99-0, Iodine
monochloride 7791-10-8, Strontium chlorate 7791-23-3, Selenium
oxychloride 7791-25-5, Sulfuryl chloride 7791-27-7, Disulfuryl
chloride 7803-51-2, Phosphine 7803-52-3, Stibine 7803-54-5,
Magnesium diamide 7803-55-6, Ammonium metavanadate 7803-57-8,
Hydrazine hydrate 7803-62-5, Silane, miscellaneous 7803-63-6,
Ammonium hydrogen sulfate 8004-09-9 8006-19-7, Amatol
8006-28-8, Soda lime 8007-56-5, Nitrohydrochloric acid 8007-58-7
8012-74-6, London Purple 8014-95-7, Fuming sulfuric acid
8049-17-0, Ferrosilicon 8050-88-2, Celluloid 8063-77-2
8065-53-0, Hexolite 8066-33-9, Pentolite 8070-50-6 9003-53-6,
Polystyrene 9004-70-0, Collodion 9056-38-6, Nitrostarch

9080-17-5, Ammonium polysulfide 10022-31-8, Barium nitrate
10024-97-2, Nitrogen oxide (N₂O), properties 10025-78-2,
Trichlorosilane 10025-85-1, Nitrogen trichloride 10025-87-3,
Phosphorus oxychloride 10025-91-9, Antimony trichloride
10026-04-7, Silicon tetrachloride 10026-11-6, Zirconium
tetrachloride 10026-13-8, Phosphorus pentachloride 10031-13-7
10031-87-5, 2-Ethylbutyl acetate 10034-81-8, Magnesium perchlorate
10034-85-2, Hydrogen iodide 10035-10-6, Hydrogen bromide,
miscellaneous 10039-54-0, Hydroxylamine sulfate 10042-76-9,
Strontium nitrate 10045-94-0, Mercuric nitrate 10049-04-4,
Chlorine dioxide 10099-74-8, Lead nitrate 10101-50-5
10102-06-4, Uranyl nitrate 10102-12-2, Selenium nitride
10102-18-8, Sodium selenite 10102-43-9, Nitric oxide,
miscellaneous 10102-44-0, Nitrogen dioxide, miscellaneous
10102-49-5, Ferric arsenate 10102-50-8, Ferrous arsenate
10103-50-1, Magnesium arsenate 10118-76-0 10124-37-5, Calcium
nitrate 10124-48-8, Mercury ammonium chloride 10124-50-2,
Potassium arsenite 10137-74-3, Calcium chlorate 10192-29-7,
Ammonium chlorate 10241-05-1, Molybdenum pentachloride
10256-53-8, Methanamine, compd. with trinitromethane, miscellaneous
10294-33-4, Boron tribromide 10294-34-5, Boron trichloride
10306-83-9 10326-21-3, Magnesium chlorate 10326-24-6
10361-95-2, Zinc chlorate 10377-60-3, Magnesium nitrate
10377-66-9, Manganese nitrate 10415-75-5, Mercurous nitrate
10421-48-4, Ferric nitrate 10431-47-7 10544-63-5, Ethyl
crotonate 11069-19-5, Dichlorobutene 11071-47-9, Isooctene
11099-22-2 11105-16-1, Zirconium hydride 11122-26-2 11135-81-2
11138-49-1, Sodium aluminate 11140-68-4, Titanium hydride
12001-29-5, Chrysotile 12002-19-6, Mercury nucleate 12002-48-1,
Trichlorobenzene 12030-88-5, Potassium superoxide 12031-80-0,
Lithium peroxide 12033-49-7, Nitrogen trioxide 12034-12-7,
Sodium superoxide 12057-74-8, Magnesium phosphide (Mg₃P₂)
12125-01-8, Ammonium fluoride 12135-76-1, Ammonium sulfide
12136-15-1, Mercury nitride 12164-94-2, Ammonium azide
12167-20-3, Nitrocresol 12172-67-7, Actinolite 12401-70-6,
Potassium monoxide 12401-86-4, Sodium monoxide 12427-38-2, Maneb
12440-42-5, Tin phosphide (Sn₃P₄) 12504-16-4, Strontium phosphide
(Sr₃P₂) 12627-52-0, Antimony sulfide 12627-52-0D, Antimony
sulfide, mixt. with chlorates 12640-89-0, Selenium oxide
12653-71-3, Mercury oxide 12737-18-7, Calcium silicide
12751-03-0, Cordite 12771-08-3, Sulfur chloride 12789-46-7, Amyl
acid phosphate 13092-75-6, Silver acetylde 13138-45-9
13225-10-0, .alpha.-Methylglucoside tetranitrate 13319-75-0, Boron
trifluoride dihydrate 13410-01-0, Sodium selenate 13424-46-9,
Lead azide 13426-91-0, Cupriethylenediamine 13437-80-4, Mercuric
arsenate 13444-85-4, Nitrogen triiodide 13446-10-1, Ammonium
permanganate 13446-48-5, Ammonium nitrite 13450-97-0, Strontium
perchlorate 13453-30-0, Thallium chlorate 13463-39-3, Nickel

carbonyl 13463-40-6, Iron pentacarbonyl 13464-33-0, Zinc
 arsenate 13464-58-9D, Arsenous acid, copper complexes
 13465-73-1, Bromosilane 13465-95-7, Barium perchlorate
 13472-08-7 13473-90-0, Aluminum nitrate 13477-00-4, Barium
 chlorate 13477-10-6, Barium hypochlorite 13477-36-6, Calcium
 perchlorate 13520-83-7, Uranyl nitrate hexahydrate 13537-32-1,
 Fluorophosphoric acid 13548-38-4, Chromium nitrate 13597-54-1,
 Zinc selenate 13597-99-4, Beryllium nitrate 13598-36-2,
 Phosphonic acid 13637-63-3, Chlorine pentafluoride 13637-76-8,
 Lead perchlorate 13718-59-7 13746-89-9, Zirconium nitrate
 13762-51-1, Potassium borohydride 13766-44-4, Mercury sulfate
 13769-43-2, Potassium metavanadate 13770-96-2, Sodium aluminum
 hydride 13774-25-9 13779-41-4, Difluorophosphoric acid
 13780-03-5, Calcium bisulfite 13823-29-5, Thorium nitrate
 13840-33-0, Lithium hypochlorite 13840-33-0D, Lithium
 hypochlorite, mixts. 13843-59-9, Ammonium bromate 13863-88-2,
 Silver azide 13967-90-3, Barium bromate 13973-87-0, Bromine
 azide

(packaging and transport of, stds. for)

IT 13973-88-1, Chlorine azide 13987-01-4, Tripropylene 14014-86-9
 14019-91-1, Calcium selenate 14293-73-3 14448-38-5, Hyponitrous
 acid 14519-07-4, Zinc bromate 14519-17-6, Magnesium bromate
 14546-44-2, Hydrazine azide 14567-73-8, Tremolite 14644-61-2,
 Zirconium sulfate 14666-78-5, Diethylperoxydicarbonate
 14674-72-7, Calcium chlorite 14696-82-3, Iodine azide (I(N₃))
 14977-61-8 15195-06-9 15245-44-0, Lead trinitroresorcinate
 15347-57-6, Lead acetate 15457-98-4 15512-36-4, Calcium
 dithionite 15545-97-8, 2,2'-Azodi(2,4-dimethyl-4-
 methoxyvaleronitile) 15598-34-2, Pyridine perchlorate
 15718-71-5, Ethylenediamine diperchlorate 15825-70-4, Mannitol
 hexanitrate 15875-44-2, Methylamine perchlorate 16215-49-9,
 Di-n-butyl peroxydicarbonate 16229-43-9, Vanadyl sulfate
 16339-86-9 16646-35-8 16721-80-5, Sodium hydrosulfide
 16753-36-9, Copper acetylide 16853-85-3, Lithium aluminum hydride
 16871-71-9, Zinc fluorosilicate 16871-90-2, Potassium
 fluorosilicate 16872-11-0 16893-85-9, Sodium fluorosilicate
 16901-76-1, Thallium nitrate 16919-19-0, Ammonium fluorosilicate
 16940-66-2, Sodium borohydride 16940-81-1, Hexafluorophosphoric
 acid 16941-12-1, Chloroplatinic acid 16949-15-8, Lithium
 borohydride 16949-65-8, Magnesium fluorosilicate 16961-83-4,
 Fluorosilicic acid 16962-07-5, Aluminum borohydride 17014-71-0,
 Potassium peroxide 17068-78-9, Anthophyllite 17462-58-7,
 sec-Butyl chloroformate 17639-93-9, Methyl-2-chloropropionate
 17687-37-5, Urea nitrate 17702-41-9, Decaborane
 17861-62-0 18130-44-4, Titanium sulfate 18414-36-3 18810-58-7,
 Barium azide 19159-68-3 19287-45-7, Diborane 19287-45-7D,
 Diborane, mixts. 19624-22-7, Pentaborane 20062-22-0
 20236-55-9, Barium styphnate 20600-96-8 20816-12-0, Osmium

tetroxide 20820-44-4 20859-73-8, Aluminum phosphide
21351-79-1, Cesium hydroxide (Cs(OH)) 21569-01-7 21723-86-4
21985-87-5, Pentanitroaniline 22128-62-7,
Chloromethylchloroformate 22750-93-2, Ethyl perchlorate
22751-24-2 22826-61-5 23414-72-4, Zinc permanganate
23745-86-0, Potassium fluoroacetate 24167-76-8, Sodium phosphide
24468-13-1, 2-Ethylhexylchloroformate 24884-69-3 25013-15-4,
Vinyl toluene 25109-57-3 25134-21-8 25136-55-4,
Dimethyldioxane 25154-42-1, Chlorobutane 25154-54-5,
Dinitrobenzene 25155-15-1, Cymene 25167-20-8, Tetrabromoethane
25167-67-3, Butylene 25167-70-8, Diisobutylene 25167-80-0,
Chlorophenol 25168-05-2, Chlorotoluene 25265-68-3,
Methyltetrahydrofuran 25321-14-6, Dinitrotoluene 25322-01-4,
Nitropropane 25322-20-7, Tetrachloroethane 25323-30-2,
Dichloroethylene 25339-56-4, Heptene 25340-17-4, Diethylbenzene
25377-72-4, n-Amylene 25496-08-6, Fluorotoluene 25497-28-3,
Difluoroethane 25497-29-4, Chlorodifluoroethane 25513-64-8
25550-53-2 25550-55-4, Dinitrosobenzene 25550-58-7,
Dinitrophenol 25550-58-7D, Dinitrophenol, salts 25567-67-3,
Chlorodinitrobenzene 25567-68-4, Chloronitrotoluene 25639-42-3,
Methylcyclohexanol 25721-38-4, Lead picrate 25917-35-5, Hexanol
26134-62-3, Lithium nitride 26140-60-3D, Terphenyl, halo derivs.
26249-12-7, Dibromobenzene 26471-56-7, Dinitroaniline
26471-62-5, Toluene diisocyanate 26506-47-8, Copper chlorate
26571-79-9 26618-70-2 26628-22-8, Sodium azide 26638-19-7,
Dichloropropane 26645-10-3 26760-64-5, Isopentene 26762-93-6
26914-02-3, Iodopropane 26915-12-8, Toluidine 26952-23-8,
Dichloropropene 26952-42-1, Trinitroaniline 27134-26-5,
Chloroaniline 27134-27-6, Dichloroaniline 27137-85-5,
Dichlorophenyltrichlorosilane 27152-57-4 27176-87-0,
Dodecylbenzenesulfonic acid 27195-67-1, Dimethylcyclohexane
27215-10-7 27236-46-0, Isohexene 27254-36-0, Nitronaphthalene
27458-20-4, Butyltoluene 27978-54-7, Hydrazine perchlorate
27986-95-4 27987-06-0, Trifluoroethane 28260-61-9,
Trinitrochlorobenzene 28300-74-5, Antimony potassium tartrate
28324-52-9, Pinane hydroperoxide 28479-22-3 28653-16-9
28679-16-5, Trimethylhexamethylenediisocyanate 28805-86-9,
Butylphenol 29191-52-4, Anisidine 29306-57-8 29790-52-1,
Nicotine salicylate 29903-04-6 29965-97-7, Cyclooctadiene
30236-29-4, Sucrose octanitrate 30525-89-4, Paraformaldehyde
30553-04-9, Naphthylthiourea 30586-10-8, Dichloropentane
30586-18-6, Pentamethylheptane 31058-64-7 31212-28-9,
Nitrobenzenesulfonic acid 33453-96-2 33864-17-4 34216-34-7,
Trimethylcyclohexylamine 35296-72-1, Butanol 35860-50-5,
Trinitrobenzoic acid 35860-51-6, Dinitroresorcinol 35884-77-6,
Xylyl bromide 36472-34-1, Chloropropene 37020-93-2, Mercury
cyanide (Hg(CN)) 37187-22-7, Acetyl acetone peroxide 37206-20-5,
Methyl isobutyl ketone peroxide 37273-91-9, Metaldehyde

37320-91-5, Mercury iodide 37368-10-8, Aluminum vanadium oxide
 38139-71-8, Bromide chloride 38232-63-2, Mercurous azide
 38483-28-2, Methylene glycol dinitrate 39377-49-6, Copper cyanide
 39377-56-5, Lead sulfide 39404-03-0, Magnesium silicide
 39409-64-8, TVOPA 39432-81-0 39455-80-6, Ammonium sodium
 vanadium oxide 39990-99-3, Lithium acetylde ethylenediamine
 complex 40058-87-5, Isopropyl-2-chloropropionate 41195-19-1
 41587-36-4, Chloronitroaniline 42296-74-2, Hexadiene 43133-95-5,
 Methylpentane 50815-73-1 50874-93-6 51006-59-8 51023-22-4,
 Trichlorobutene 51064-12-1 51312-23-3, Mercury bromide
 51317-24-9, Lead nitroresorcinat 51325-42-9, Copper selenite
 51845-86-4, Ethyl borate 52181-51-8 53014-37-2,
 Tetranitroaniline 53408-91-6, Mercury thiocyanate 53422-49-4
 53569-62-3 53839-08-0 53906-68-6 54141-09-2, 1,4,-Butynediol
 54413-15-9, Tritonal 54727-89-8 54958-71-3 55510-04-8,
 Dinitroglycoluril 55810-17-8 56929-36-3 56960-91-9
 57607-37-1, Octolite 58164-88-8, Antimony lactate 58499-37-9
 58933-55-4 59753-21-8 59917-23-6 60168-33-4 60616-74-2,
 Magnesium hydride 60869-68-3 60999-18-0 61061-91-4
 61878-56-6 63085-06-3 63283-80-7, Dichloroisopropyl ether
 63597-41-1, Octadiene 63885-01-8 63907-41-5 63937-14-4
 63938-10-3, Chlorotetrafluoroethane 63988-31-8 64173-96-2
 64973-06-4, Arsenic bromide 66634-68-2 67632-66-0 68833-55-6,
 Mercury acetylde (Hg(C₂H)) 68848-64-6 68975-47-3, Isoheptene
 69523-06-4, Ferrocerium
 (packaging and transport of, stds. for)

L29 ANSWER 3 OF 6 HCA COPYRIGHT 2004 ACS on STN

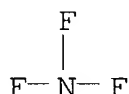
85:145351 Fluoro compound production. Vitek, Richard K. (Allied
 Chemical Corp., USA). U.S. US 3961024 **19760601**, 5 pp.
 (English). CODEN: USXXAM. APPLICATION: US 1963-289778 19630618.

AB Fluoro-nitrogen compds., such as **NF₃**, N₂F₂ and N₂F₄, were
 prepd. by direct fluorination of certain compds. contg. N-H bonds.
 Alkali metal amides, **urea**, biuret, amides, hydrazine,
 diamines, and melamines reacted with elemental F in the presence of
 a catalyst at a temp. below the phase-change temp. of the starting
 material. The catalyst was a metal or metal fluoride which formed
 an acid salt with **HF**.

IT **7783-54-2P**
 (from alkali metal amides, by fluorination)

RN 7783-54-2 HCA

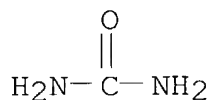
CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7782-41-4, reactions
(with alkali metal amides)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IT 57-13-6, reactions
(with fluorine in presence of sodium fluoride)
RN 57-13-6 HCA
CN Urea (8CI, 9CI) (CA INDEX NAME)



IC C01B021-52
NCL 423406000
CC 49-8 (Industrial Inorganic Chemicals)
ST **nitrogen fluoride**; amide fluorination
IT 7783-54-2P
(from alkali metal amides, by fluorination)
IT 7782-41-4, reactions
(with alkali metal amides)
IT 57-13-6, reactions 302-01-2, reactions
(with fluorine in presence of sodium fluoride)

L29 ANSWER 4 OF 6 HCA COPYRIGHT 2004 ACS on STN
72:62122 Anode reaction in a potassium fluoride-hydrofluoric acid-
urea system. Watanabe, Nobuatsu; Tasaka, Akimasa;
Nakanishi, Koichiro (Kyoto Univ., Kyoto, Japan). Denki Kagaku oyobi
Kogyo Butsuri Kagaku, 37(10), 705-10 (Japanese) 1969.
CODEN: DKOKAZ. ISSN: 0366-9297.

AB The effect of (NH₂)₂CO concn. on the anode reaction in the system
KF-HF-(NH₂)₂CO at 130.degree. was studied by the
potentiostatic and the potential sweep methods. The anode was made
of amorphous C and a Pt rod was used as the reference electrode.
The compn. of the anode gas depended on the anode potential, anode
c.d., and concn. of (NH₂)₂CO. The potential at which **NF₃**
and F₂O + **F₂** were detected shifted to the pos. side with
increasing concn. of (NH₂)₂CO. When the concn. of (NH₂)₂CO was kept
const., the compn. of gas changed from (N₂ + CO₂) to (**NF₃**)
to (F₂O + **F₂**) with the change of potential to more noble
values. When the potential was kept const., the compn. of gas
changed from (F₂O + **F₂**) to (**NF₃**) to (N₂ + CO₂)
with the increasing concn. of (NH₂)₂CO. The c.d. for **NF₃**

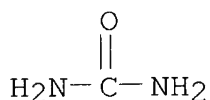
depended on the concn. of $(\text{NH}_2)_2\text{CO}$. It reached a max. value of >55% at 2-3 mole % $(\text{NH}_2)_2\text{CO}$. The c.d. of formation of **NF3** was lower than that of the **KF-HF-NH4F** system owing to the generation of N_2 , CO_2 , CF_4 , N_2O , and $\text{F}_2\text{O} + \text{F}_2$. The optimum condition of practical operation was: concn. of $(\text{NH}_2)_2\text{CO}$ 2-3 mole %, c.d. 10^{-3} - 10^{-2} A/cm², anode potential 5.0-5.5 V vs. Pt electrode. A considerable amt. of CF_4 was contained in the product.

IT 57-13-6, reactions

(electrolysis of potassium fluoride and hydrofluoric acid medium in presence of, anode gas compn. in relation to)

RN 57-13-6 HCA

CN Urea (8CI, 9CI) (CA INDEX NAME)



IT 7664-39-3, reactions

(electrolysis of, with potassium fluoride, **urea** effect on anode gas compn. in)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

CC 77 (Electrochemistry)

ST **urea** electrolysis fluorides; electrolysis fluorides

urea; fluorides electrolysis **urea**;

nitrogen trifluoride prepn; trifluoride N prepn

IT Anodes

(carbon, in electrolysis of potassium fluoride in hydrofluoric acid medium, **urea** effect on compn. of gases from)

IT 57-13-6, reactions

(electrolysis of potassium fluoride and hydrofluoric acid medium in presence of, anode gas compn. in relation to)

IT 7789-23-3

(electrolysis of, with hydrofluoric acid, **urea** effect on anode gas compn. in)

IT 7664-39-3, reactions

(electrolysis of, with potassium fluoride, **urea** effect on anode gas compn. in)

L29 ANSWER 5 OF 6 HCA COPYRIGHT 2004 ACS on STN

60:50083 Original Reference No. 60:8802c-d Nuclear magnetic antishielding of nuclei in molecules. Magnetic moments of ^{19}F , ^{14}N , and ^{15}N . Baker, Milton R.; Anderson, Charles H.; Ramsey, Norman F.

(Harvard Univ.). Physical Review, 133(6A), 1533-6 (Unavailable)
 1964. CODEN: PHRVAO. ISSN: 0031-899X.

AB The combination of mol. beam data on spin-rotational interactions in
 mols. with chem. shift data was used to calc. the paramagnetic part
 of the nuclear magnetic shielding const. for F in **HF** and
F2. With the assumption of the sign of the spin-rotational
 const. in $^{15}\text{N}_2$ as pos. (i.e., a net neg. rotational magnetic field
 at the N nucleus), the paramagnetic part of the nuclear magnetic
 shielding const. in N_2 was calcd. The results, when combined with
 reliable calcns. of the diamagnetic part of the shielding const.,
 yield the total shielding consts. These are: F in **HF**,
 $\sigma = (414.9 \pm 1.4) \times 10^{-6}$; F in **F2**, $\sigma = (-210 \pm 8.0) \times 10^{-6}$;
 N in N_2 , $\sigma = (-101 \pm 25.0) \times 10^{-6}$, and demonstrate the phenomenon of nuclear magnetic
 antishielding in **F2** and N_2 , as well as in other compds.
 Use of these shielding consts. permits considerable improvement in
 the estimates of the bare nuclear magnetic moments of F and N. The
 results are $\mu_{\text{N}}(\text{F}) = 2.628353 \pm 0.000005$, $\mu_{\text{N}}(^{14}\text{N}) = 0.403562$
 ± 0.000010 , $\mu_{\text{N}}(^{15}\text{N}) = -0.283049 \pm 0.000007 \times 10^{-9}$ m.

IT 7782-41-4, Fluorine.
 (nuclear magnetic antishielding and nuclear magnetic moment of)

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IT 7664-39-3, Hydrofluoric acid
 (nuclear magnetic resonance of F in, nuclear magnetic moment and)

RN 7664-39-3 HCA

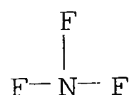
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2, Nitrogen fluoride,
NF3
 (nuclear magnetic resonance of F in, nuclear magnetic moment in
 relation to)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)

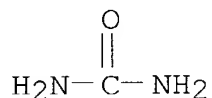


IT 57-13-6, Urea

(nuclear magnetic resonance of N in, nuclear magnetic moment in relation to)

RN 57-13-6 HCA

CN Urea (8CI, 9CI) (CA INDEX NAME)



CC 10 (Spectra and Some Other Optical Properties)

IT 7782-41-4, Fluorine.

(nuclear magnetic antishielding and nuclear magnetic moment of)

IT 7637-07-2, Boron fluoride 7664-39-3, Hydrofluoric acid

7783-55-3, Phosphorus fluoride, PF₃

(nuclear magnetic resonance of F in, nuclear magnetic moment and)

IT 2551-62-4, Sulfur fluoride, SF₆ 7783-54-2,

Nitrogen fluoride, NF₃ 7783-56-4,

Antimony fluoride, SbF₃ 7783-61-1, Silicon fluoride, SiF₄

7783-70-2, Antimony fluoride, SbF₅ 7783-79-1, Selenium fluoride,

SeF₆ 7783-80-4, Tellurium fluoride, TeF₆ 7784-35-2, Arsenic

fluoride, AsF₃ 7787-49-7, Beryllium fluoride 7787-71-5, Bromine

fluoride, BrF₃ 7790-91-2, Chlorine fluoride, ClF₃ 16027-92-2,

Phosphorus fluoride, PF₃

(nuclear magnetic resonance of F in, nuclear magnetic moment in relation to)

IT 51-92-3, Ammonium, tetramethyl 57-13-6, **Urea**

60-35-5, Acetamide 121-44-8, Triethylamine 142-84-7,

Dipropylamine 302-01-2, Hydrazine 7664-41-7, Ammonia

7803-49-8, Hydroxylamine 14798-03-9, Ammonium

(nuclear magnetic resonance of N in, nuclear magnetic moment in relation to)

L29 ANSWER 6 OF 6 HCA COPYRIGHT 2004 ACS on STN

55:1161 Original Reference No. 55:184a-b Electrolytic production of

nitrogen trifluoride. Schmeisser, Martin GB

840026 19600706 (Unavailable). APPLICATION: GB .

AB **NF₃** is produced by the electrolysis of **urea** in

anhyd. **HF** in high purity and with yields of about 50%.

The voltage is about 6. In addn. to small amts. of CF₄ and F₂O, as

well as high-mol.-wt. compds. contg. C and F, the new

process produces appreciable amts. of NH₃, COF₂, and CO₂.

Thus, 200 g. **urea** was dissolved at -10.degree. in 2 l.

anhyd. **HF** to give a soln. of CO(NH₂)₂.2HF. The soln. was

electrolyzed at the same temp. with 6 v. and 20 amp. The volatile

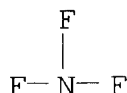
reaction products were passed through tubes contg. solid KF to

remove entrained **HF**, then washed with aq. alk. Na₂S₂O₃ to

remove COF₂ and F₂O. Entrained H₂O vapor from the Na₂S₂O₃ soln. was

removed in a trap held at -78.degree.. The crude product was fractionated at 183-196.degree. in vacuo, removing all impurities except 1% CF4.

IT 7783-54-2, Nitrogen fluoride,
NF3
(manuf. by electrolysis of urea)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 4 (Electrochemistry)
IT 7783-54-2, Nitrogen fluoride,
NF3
(manuf. by electrolysis of urea)
IT 13770-40-6, Amidogen (NH2)
(manuf. by urea electrolysis)
IT 353-50-4, Carbonyl fluoride
(manuf. of, by urea electrolysis)

=> d 130 1-15 cbib abs hitstr hitind

L30 ANSWER 1 OF 15 HCA COPYRIGHT 2004 ACS on STN

137:319206 Dry etching method and apparatus for semiconductor device fabrication. Sakai, Takayuki; Ohiwa, Tokuhisa (Kabushiki Kaisha Toshiba, Japan). U.S. Pat. Appl. Publ. US 2002155724 A1 20021024, 11 pp. (English). CODEN: USXXCO. APPLICATION: US 2002-124247 20020418. PRIORITY: JP 2001-121257 20010419.

AB A dry etching process and app. which do not use fluorocarbons as the etchant are claimed. In dry etching a semiconductor workpiece, a mixt. of a C-free, F-contg. gas and a F-free, C-contg. gas was used as an etching gas.

IT 7664-39-3, Hydrogen fluoride, processes
7782-41-4, Fluorine, processes
7783-54-2, Nitrogen trifluoride
(dry etchant for semiconductor device fabrication)

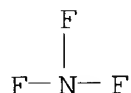
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F--F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01L021-302
ICS H01L021-461
NCL 438710000
CC 76-11 (Electric Phenomena)
IT 64-17-5, Ethanol, processes 74-82-8, Methane, processes
2551-62-4, Sulfur hexafluoride 7637-07-2, Boron trifluoride,
processes 7664-39-3, **Hydrogen fluoride**
, processes 7782-41-4, **Fluorine**,
processes 7783-54-2, Nitrogen
trifluoride 7787-71-5, Bromine trifluoride 7790-91-2,
Chlorine trifluoride
(dry etchant for semiconductor device fabrication)

L30 ANSWER 2 OF 15 HCA COPYRIGHT 2004 ACS on STN
128:56347 Manufacture of semiconductor device by dry etching. Sugino,
Shigeyuki (Fujitsu Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 09321025
A2 19971212 Heisei, 6 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1996-136199 19960530.

AB The manuf. method involves (1) forming an element-isolation oxide
film on a semiconductor substrate via a pad oxide film and a Si thin
film by selectively oxidizing the substrate using a Si3N4 film as an
oxidn. resistant film, (2) etching using a reactive **gas**
contg. a **F**-based **gas** (partial pressure Pf) and a
Cl-based gas (partial pressure Pcl) at Pf > Pcl, and (3)
continuously etching at higher Pcl by controlling a flow ratio of
the gases. The manuf. method is useful for continuously dry etching
a Si and Si3N4 film without damaging to the substrate.

IT 7664-39-3, **Hydrogen fluoride**, uses
7782-41-4, **Fluorine**, uses 7783-54-2,
Nitrogen trifluoride
(continuously **dry** etching of Si and Si3N4 film using
F and Cl **gas** in semiconductor device manuf.)

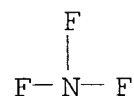
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01L021-3065
ICS C23F004-00; H01L021-316
CC 76-3 (Electric Phenomena)
ST semiconductor dry etching silicon nitride; **fluorine**
chlorine **gas** silicon etching semiconductor; etching gas
flow ratio controlling semiconductor
IT Semiconductor device fabrication
(continuously dry etching of Si and Si3N4 film using **F**
and Cl **gas** in semiconductor device manuf.)
IT Etching
(dry; continuously dry etching of Si and Si3N4 film using
F and Cl **gas** in semiconductor device manuf.)
IT 7440-21-3, Silicon, processes 12033-89-5, Silicon nitride,
processes
(continuously dry etching of Si and Si3N4 film using **F**
and Cl **gas** in semiconductor device manuf.)
IT 7647-01-0, Hydrogen chloride, uses 7664-39-3,
Hydrogen fluoride, uses 7782-41-4,
Fluorine, uses 7782-50-5, Chlorine, uses 7783-54-2,
Nitrogen trifluoride 7790-89-8, Chlorine
fluoride 7790-91-2, Chlorotrifluoride
(continuously **dry** etching of Si and Si3N4 film using
F and Cl **gas** in semiconductor device manuf.)

L30 ANSWER 3 OF 15 HCA COPYRIGHT 2004 ACS on STN
99:160878 Tetrafluoroammonium xenonheptafluoride (NF4XeF7) and
ditetrafluoroammonium xenonoctafluoride ((NF4)2XeF8). Christe, Karl
O.; Wilson, William W. (United States Dept. of the Navy, USA). U.
S. Pat. Appl. US 391786 A0 19830819, 9 pp. Avail. NTIS
Order No. PAT-APPL-6-391 786. (English). CODEN: XAXXAV.

APPLICATION: US 1982-391786 19820624.

- AB NF4XeF7 was prepd. from NF4HF2 and XeF6 and was photolytically decompd. by blue 4880 .ANG. laser light to give (NF4)2XeF8 which, in energetic applications, has the highest **NF3-F2** yield of any presently known compd. and also gives the highest theor. detonation pressures in explosive compns. Thus, 15.54 CsF and 15.65 mmol NF4SbF6 were mixed with 9 mL **dry HF**, processed, reacted with 17.87 mmol XeF6, and treated in several stages to remove volatiles and to give 15.54 mmol (93.5%) NF4XeF7. Photolytic decompn. gave the (NF4)2XF8 which is useful for explosive and propellant formulations.
- CC 50-1 (Propellants and Explosives)

L30 ANSWER 4 OF 15 HCA COPYRIGHT 2004 ACS on STN

- 95:34634 Syntheses and properties of FOIF4O, ClOIF4O, HOIF4O, and tetrafluoroperiodates. Christe, Karl O.; Wilson, Richard D.; Schack, Carl J. (Rocketdyne Div., Rockwell Int. Corp., Canoga Park, CA, 91304, USA). Inorganic Chemistry, 20(7), 2104-14 (English) 1981. CODEN: INOCAJ. ISSN: 0020-1669.

- AB Mixts. of cis- and trans-CsIF4O2 were prepd. by the interaction of CsIO4 with **anhyd. HF**, BrF5, ClF3, ClF5, or **F2**. The vibrational spectra of these mixts. were recorded, and partial assignments are given for cis- and trans-IF4O2-. The assignments for trans-IF4O2- are supported by a normal-coordinate anal. The CsIF4O2 salt dissolves in MeCN with the formation of IF4O2- anions but undergoes solvolysis in **anhyd. HF** with formation of HOIF4O. An improved synthesis of HOIF4O from CsIF4O2 and BiF5 in **anhyd. HF** is reported, and its Raman and 19F NMR spectra are recorded. The interaction of CsIF4O2 with NF4SbF6 in **anhyd. HF** results in solns. contg. NF4+, HF2-, and HOIF4O. When standing or when pumped to dryness, these mixts. decomp. to yield **NF3** and the new compd. FOIF4O in high yield. The latter compd., the first known example of an iodine hypofluorite, was thoroughly characterized and shown by vibrational and NMR spectroscopy to be a mixt. of the cis and trans isomers. For comparison, the vibrational spectra of IF5O were also recorded. The reaction of CsIF4O2 with ClOSO2F yielded the novel compd. ClOIF4O. The fluorination reactions of CsIO4, CsIF4O2, IF5O, and HOIF4O with elementary F were also studied.

- IT 7664-39-3, reactions 7782-41-4, reactions
(reaction of, with cesium periodate)
- RN 7664-39-3 HCA
- CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

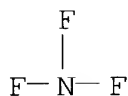
CC 78-8 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 73
IT 7664-39-3, reactions 7782-41-4, reactions
7789-30-2 7790-91-2 13637-63-3
(reaction of, with cesium periodate)

L30 ANSWER 5 OF 15 HCA COPYRIGHT 2004 ACS on STN
93:87468 Synthesis and properties of $\text{NF}_4+\text{ClO}_4^-$ and $\text{NF}_4+\text{HF}_2-\cdot\text{nHF}$ and some reaction chemistry of tetrafluoroammonium(+1) salts. Christe, Karl O.; Wilson, William W.; Wilson, Richard D. (Rocketdyne Div., Rockwell Int. Corp., Canoga Park, CA, 91304, USA). Inorganic Chemistry, 19(6), 1494-8 (English) 1980. CODEN: INOCAJ. ISSN: 0020-1669.

AB The possibility of prepg. $\text{NF}_4+\text{SO}_4^-$ (X = Cl, Br, I) salts by metathesis between NF_4SbF_6 and CsXO_4 is **anhyd. HF** soln. at -78.degree. was studied. Of these NF_4XO_4 salts, NF_4ClO_4 was isolated and characterized by vibrational and ^{19}F NMR spectroscopy. The unstable white solid NF_4ClO_4 decompd. at 25.degree. to give **NF3** and FOClO_3 in high yield. The NF_4BrO_4 salt is of marginal stability in **HF** soln. and decomp. to **NF3**, O_2 , and FBrO_2 . Attempts to isolate NF_4BrO_4 as a solid resulted in explosions. The NF_4IO_4 salt could not be prepd. due to the facile fluorination of IO_4^- to IF_4O_2^- by either **HF** or BrF_5 . Attempts to prep. $\text{NF}_4+\text{XF}_4\text{O}^-$ (X = Cl, Br) salts by metathesis between NF_4SbF_6 and CsXF_4O in BrF_5 soln. at 25.degree. were unsuccessful; with BrF_4O^- , fluoride abstraction occurred, resulting in the formation of **NF3**, **F2**, and BrF_3O , whereas CsClF_4O underwent a displacement reaction with BrF_5 to give CsBrF_6 and ClF_3O . The metathetical synthesis of NF_4NO_3 could not be studied in **HF** due to the reaction of NO_3^- with **HF** to give NO_2^+ , H_2O , and HF_2^- . The metathesis between NF_4SbF_6 and CsF in **HF** at -78.degree. did not produce NF_4+F^- but produced an unstable white solid of the compn. $\text{NF}_4+\text{HF}_2-\cdot\text{nHF}$. The compn., thermal stability, spectroscopic properties, and decompn. products of this solid were studied. The $\text{NF}_4+\text{HF}_2^-$ salt is stable in **HF** soln. at 25.degree. and the synthetic usefulness of these solns. for the synthesis of other NF_4+ salts is briefly discussed. Attempts to prep. NCl_4^+ and NCl_2O^+ salts by F-Cl exchange between BCl_3 and NF_4^+ and NF_2O^+ were unsuccessful.

CC 78-5 (Inorganic Chemicals and Reactions)

- L30 ANSWER 6 OF 15 HCA COPYRIGHT 2004 ACS on STN
91:41521 Self-clinkering nitrogen tetrafluoride(1+) ion compositions for
nitrogen trifluoride-fluorine
gas generators. Christe, Karl O.; Schack, Carl J.; Wilson,
Richard D. (Rockwell International Corp., USA). U.S. US 4152406
19790501, 6 pp. (English). CODEN: USXXAM. APPLICATION: US
1976-734153 19761020.
- AB Compds. having NF₄⁺ as the cation and that decomp. to a gaseous
mixture of **NF₃** and **F₂** containing no gaseous Lewis
acids are prepared without need for clinker-forming additives for
their complexing. The synthesis is based on metathetical and
displacement reactions in **anhyd. HF** of NF₄BF₄
with SnF₄, and TiF₄ and of NF₄SbF₆ with Cs₂SnF₆ or Cs₂TiF₆.
- IT **7783-54-2**
(reaction of, with fluorine and titanium fluoride)
- RN 7783-54-2 HCA
- CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



- IT **7782-41-4**, reactions
(reaction of, with **nitrogen fluoride** and
titanium fluoride)
- RN 7782-41-4 HCA
- CN Fluorine (8CI, 9CI) (CA INDEX NAME)
- F-F
- IC C01G021-52; C01G023-02
- NCL 423351000
- CC 49-7 (Industrial Inorganic Chemicals)
- ST fluoroammonium salts manuf; fluorostannate salts manuf;
fluorotitanate salts manuf; **nitrogen fluoride**
fluorine generator
- IT 7783-63-3
(reaction of, with fluorine and **nitrogen**
fluoride)
- IT **7783-54-2**
(reaction of, with fluorine and titanium fluoride)
- IT **7782-41-4**, reactions
(reaction of, with **nitrogen fluoride** and
titanium fluoride)

90:106624 Bis(tetrafluoroammonium) hexafluoronickelate high energy solid propellant oxidizer. Christe, Karl O. (Rockwell International Corp., USA). U.S. US 4108965 **19780822**, 3 pp. (English). CODEN: USXXAM. APPLICATION: US 1976-732623 19761015.

AB (NF₄)NiF₆, a high-energy oxidizer useful for solid propellants and **NF₃-F₂** gas generators, is prepd. from Cs₂NiF₆ and NF₄SbF₆ in **anhyd. HF**. Thus, 13.45 Cs₂NiF₆ and 27.9 mmol NF₄SbF₆ were stirred with 10 mL liq. **anhyd. HF** in a U-trap for 30 min at 25.degree., cooled to -78.degree., and the contents filtered to a 2nd U-trap. The solid retained by the filter consisted of 10.0 g CsSbF₆ and the solid (4.4 g) obtained after evapn. of the **HF** from the filtrate consisted of a mixt. of (NF₄)₂NiF₆ 81.7, NF₄SbF₆ 14.4, and CsSbF₆ 3.9 mol.%.

IC C01G053-00

NCL 423351000

CC 50-2 (Propellants and Explosives)

L30 ANSWER 8 OF 15 HCA COPYRIGHT 2004 ACS on STN

90:57388 Tetrafluoroammonium tetrafluoroborate. Christe, Karl O.; Shack, Carl J.; Wilson, Richard D. (Rockwell International Corp., USA). U.S. US 4107275 **19780815**, 3 pp. (English). CODEN: USXXAM. APPLICATION: US 1976-731198 19761012.

AB NF₄BF₄ is prepd. by heating SbF₅ to 250.degree. in the presence of an excess **NF₃** and **F₂**, and the NF₄SbF₆ formed is combined with CsBF₄ in **anhydride HF**. Thus, SbF₅ 1.8, **NF₃** 3.6, and **F₂** 3.6 mol were mixed at -196.degree. and heated to 250.degree. for 72 h in a cylinder. The unreacted **NF₃** and **F₂** were removed at room temp. to obtain 1.8 mol NF₆SbF₆. A mixt. of CsBF₄ 2.15 and NF₄SbF₆ 2.27 mol was added with 27.5 mol **anhyd. HF**, and the mixt. was agitated at 25.degree. for 1 h and cooled to -78.degree.. The CsSbF₆ ppt. was filtered from the NF₄BF₄ soln. and the filtrate was pumped to dryness resulting in 310 g of product contg. 95 mol % NF₄BF₄.

IC C01B035-14

NCL 423276000

CC 49-5 (Industrial Inorganic Chemicals)

L30 ANSWER 9 OF 15 HCA COPYRIGHT 2004 ACS on STN

85:13133 Low-temperature ultraviolet photolysis and its application to the synthesis of novel and known tetrafluoronitrogen(1+) salts. Christe, Karl O.; Schack, Carl J.; Wilson, Richard D. (Rocketdyne, Div., Rockwell Int., Canoga Park, CA, USA). Inorganic Chemistry, 15(6), 1275-82 (English) **1976**. CODEN: INOCAJ. ISSN: 0020-1669.

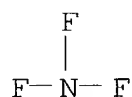
AB Low-temp. uv photolysis was used to synthesize the novel NF₄⁺ salts NF₄PF₆ and NF₄GeF₅ and the known salts NF₄BF₄ and NF₄AsF₆. This

technique offers the first convenient, simple, and high-yield synthesis for NF_4BF_4 . The NF_4PF_6 and NF_4GeF_5 salts were also prepd. from NF_4BF_4 by displacement reactions with PF_5 and GeF_4 , resp. Treatment of NF_4GeF_5 with **anhydrous HF** resulted in its conversion to $(\text{NF}_4)_2\text{GeF}_6$, and $(\text{NF}_4)_3\text{GeF}_6$ was quant. converted back to NF_4GeF_5 by treatment with an excess of GeF_4 . The NF_4^+ salts were characterized by vibrational and ^{19}F NMR spectroscopy and x-ray powder data. A cis-fluorine-bridged polymeric structure is proposed for GeF_5^- in its NF_4^+ salt based on the spectroscopic data, its thermal stability, and lack of reaction with either liq. N_2F_4 or FNO_2 . The applicability of low-temp. uv photolysis to other reactant systems was briefly studied. The hydrolysis of NF_4^+ salts was reinvestigated.

IT 7782-41-4, reactions
 (photolysis of, in presence of fluorine-contg. compds.)
 RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

IT 7783-54-2
 (photolysis of, with boron trifluoride and Group VA
 pentafluorides)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF_3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 78-7 (Inorganic Chemicals and Reactions)
 Section cross-reference(s): 73, 74, 75
 IT 7782-41-4, reactions
 (photolysis of, in presence of fluorine-contg. compds.)
 IT 7783-54-2
 (photolysis of, with boron trifluoride and Group VA
 pentafluorides)
 IT 7637-07-2, reactions 7647-19-0 7783-58-6 7784-36-3
 (photolysis of, with fluorine and **nitrogen**
trifluoride)

L30 ANSWER 10 OF 15 HCA COPYRIGHT 2004 ACS on STN
 73:134358 Solubility of **F2**, **NF3**, and O_2 in
anhydrous liquid **HF**. Rewick, R. T.; Tolberg, W.
 E.; Hill, Marion Elzie (Stanford Res. Inst., Menlo Park, CA, USA).
 Journal of Chemical and Engineering Data, 15(4), 527-30 (English)

1970. CODEN: JCEAAX. ISSN: 0021-9568.

AB The soly. of **F2**, **NF3**, and **O2** in **anhyd.** liq. **HF** was measured at several temps. The soly. of **F2** passes through a min. between -0.21 and 19.8.degree. but between -0.21 and -77.2.degree. it can be computed to within 3% of the obsd. value. The heat of soln. is -588 cal mole⁻¹. The soly. of **NF3** was measured at 3 temps.; it does not exhibit a soly. min. similar to that of **F2**. At -77.2.degree. a curved plot of partial pressure vs. molality was obsd. at pressures >1 atm. The heat of soln. is -1533 cal mole⁻¹. The soly. of **O2**, measured at -0.21 and 19.8.degree., was similar to that of **F2**. The heat of soln. calcd. from the soly, at these 2 temps. is -352 cal mole⁻¹. The soly. of **O2** in **HF** at 19.8.degree. and -0.21.degree. was larger by factors of 5 and 10, resp., than the literature values for soly. in **H2O** at the same temps.

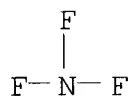
IT 7664-39-3, properties
(soly. in anhydrous liq., of gases)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4, properties 7783-54-2
(soly. of, in anhydrous liq. hydrofluoric acid)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 68 (Phase Equilibriums, Chemical Equilibriums, and Solutions)
ST fluorine soly hydrogen fluoride;
nitrogen fluorides soly hydrogen
fluoride; oxygen soly hydrogen fluoride;
hydrogen fluoride solvent
IT 7664-39-3, properties
(soly. in anhydrous liq., of gases)
IT 7782-41-4, properties 7782-44-7, properties

7783-54-2

(soly. of, in anhydrous liq. hydrofluoric acid)

L30 ANSWER 11 OF 15 HCA COPYRIGHT 2004 ACS on STN

69:64427 Analysis of **F2**, **HF**, **NF3**,

trans-N2F2, and N2F4 mixtures by gas chromatography. Spears, Larry G.; Hackerman, Norman (TRACTOR, Inc., Austin, TX, USA). Journal of Gas Chromatography, 6(7), 392-3 (English) 1968. CODEN: JGCRAY. ISSN: 0096-2686.

AB The volatile products of electrolysis of NH4HF2 in **anhyd.** **HF** were investigated by gas chromatog. by using two 7-ft. F-passivated Monel tubes with cryogenic programming (10.degree./min.) and a combination of 20-ft. Monel column packed with 50% Halocarbon oil 13-21 on 30-50-mesh shredded Teflon and 50 ft. Kel-F tubing packed with 50% Halcarbon oil 13-21 on 30/50 mesh Kel-F molding powder at ambient temp. and He flow rate 50 cc./min. For the 7-ft. Monel column, the retention time (min.) and lower limit of detection (ppm.) were for F 0.2 and 210, **NF3** 5.9 and 180, trans-N2F2 7.8 and 270, N2F4 11.6 and 250, **HF** 31.0 and 220, and for the 70-foot column F 4 and 93.5, **NF3** 4.3 and 6.5, trans-N2F2 4.5 and 88.4; and **HF** 6.3 and 105. By using the 7-foot column, no N2F4 was detected by ir and mass spectral anal.

IT 7664-39-3, analysis 7782-41-4, analysis
7783-54-2

(detn. of, in ammonium fluoride (NH4HF2) electrolysis products)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

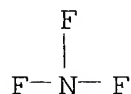
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 79 (Inorganic Analytical Chemistry)

ST **nitrogen fluorides** gas chromatog; fluorides N

gas chromatog; gas chromatog **N fluorides**;
chromatog **N fluorides**; **fluorine**
gas chromatog; ammonium bifluoride electrolysis;
electrolysis ammonium bifluoride

IT 7664-39-3, analysis 7782-41-4, analysis
7783-54-2 10036-47-2 13776-62-0
(detn. of, in ammonium fluoride (NH₄HF₂) electrolysis products)

L30 ANSWER 12 OF 15 HCA COPYRIGHT 2004 ACS on STN

65:94866 Original Reference No. 65:17768c-d High energy oxidizers in
solution: the system **F₂/NF₃/HF**.

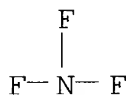
Tolberg, W. E.; Stringham, R. S.; Hill, M. E. (Stanford Res. Inst.,
Menlo Park, CA). Am. Chem. Soc., Div. Fuel Chem., Preprints, 9(1),
136-41 (English) 1965.

AB An interaction has been observed when F and **NF₃** are
dissolved in liquid **anhyd. HF**. From this system
a liquid was isolated, b. 35.degree., whose mass spectrum contained
only NF fragments not related to the known compds. N₂F₂ and N₂F₄.
The gas d. mol. wt. was 85. No structure has as yet been assigned
to the new material. However, the soly. relations and N.M.R. and
E.P.R. spectra of this system are consistent with the hypothetical
reaction, **NF₃ + F₂ .dblarw. NF₄⁺ + F⁻**, occurring
in liquid **HF**.

IT 7664-39-3, Hydrofluoric acid
(fluorine reaction with **NF₃** in liquid)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2, Nitrogen fluoride,
NF₃
(reaction with F in liquid **HF**)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7782-41-4, Fluorine.
(reaction with **NF₃** in liquid **HF**)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

CC 6 (Phase Equilibriums, Chemical Equilibriums, and Solutions)

IT Magnetic resonance absorption

Nuclear magnetic resonance

(of fluorine-HF-NF3 soln.)

IT 7664-39-3, Hydrofluoric acid

(fluorine reaction with NF3 in liquid)

IT 7783-54-2, Nitrogen fluoride,

NF3

(reaction with F in liquid HF)

IT 7782-41-4, Fluorine.

(reaction with NF3 in liquid HF)

L30 ANSWER 13 OF 15 HCA COPYRIGHT 2004 ACS on STN

62:88427 Original Reference No. 62:15741d-e The preparation of fluorodiazonium hexafluoroarsenate (N2F+AsF6-) from cis-difluorodiazine. Moy, David; Young, Archie R., II (Thiokol Chem. Corp., Denville, NJ). Journal of the American Chemical Society, 87(9), 1889-92 (English) 1965. CODEN: JACSAT. ISSN: 0002-7863.

AB cis-Difluorodiazine and AsF5 react at or below ambient temp. to yield a 1:1 solid adduct. The adduct is stable under an atm. of dry N to 150.degree.. It reacts violently with water but is sol. and stable in anhyd. HF. Although no stable deriv. of N2F+ has been reported previously, the 19F N.M.R. spectrum and x-ray diffraction pattern of the adduct strongly suggest an ionic constitution (N2F+AsF6-) in HF and in the solid state.

IT 7782-41-4, Fluorine.

(nuclear magnetic resonance of, in fluorodiazonium hexafluoroarsenate(V))

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

CC 14 (Inorganic Chemicals and Reactions)

IT Arsenic fluoride, AsF5, compd. with N2F2 (1:1)

Nitrogen fluoride, N2F2, compd. with AsF5(1:1)

IT 7782-41-4, Fluorine.

(nuclear magnetic resonance of, in fluorodiazonium hexafluoroarsenate(V))

L30 ANSWER 14 OF 15 HCA COPYRIGHT 2004 ACS on STN

61:11424 Original Reference No. 61:1886f-h,1887a-b Reaction of

phenylsilicon fluorides with primary amines. Tansjo, L. (Univ. Lund, Swed.). Acta Chemica Scandinavica, 18(2), 465-73 (English) 1964. CODEN: ACHSE7. ISSN: 0904-213X.

- AB cf. preceding abstract. Ph_2SiF_2 (33.5 g.) in 100 ml. dry Et_2O added to 0.15 mole PhMgBr in 100 ml. Et_2O , the stirred mixt. refluxed 3 hrs. and kept overnight, Et_2O distd., the mixt. held 6 hrs. at 100-110.degree., and Et_2O and 150 ml. 2.5N HCl added gave 53% Ph_3SiF (I). A vigorous reaction occurred when an aliphatic primary amine was added to PhSiF_3 (II); distg. the mixt. gave the amine and a residue that distd. at the b.p. of II and deposited in the cold part of the system as a fuming white solid. When Et_2O solns. of II and amine were mixed, a white ppt. of $(\text{RNH}_3)_2[\text{SiF}_5\text{Ph}]$ immediately formed. With PrNH_2 0.33 molar equiv. salt was formed per mole of II. Some evidence supported the view that the reaction proceeded to form mainly $(\text{PrNH}_3)_2[\text{SiF}_5\text{Ph}]$ (III), but the presence of all compds. $\text{PhSi}(\text{NHR})_n\text{F}_{3-n}$ ($\text{R} = \text{Pr}$; $n = 0, 1, 2, 3$) was indicated. These products (where $\text{R} = \text{H}, \text{Me}, \text{Et}, \text{Pr}, \text{or Bu}$) were white solids, m. >250.degree., sublimed 225-75.degree. (infrared spectra detd.). They dissolved in H_2O to give acidic solns., which became turbid on standing, owing to hydrolysis. III (0.587 g.) and 0.342 g. $\text{PhSi}(\text{NHPr})_3$ heated 1 hr. at 60.degree. gave $\text{PhSi}(\text{NHPr})\text{F}_2$ and PrNH_2 . Ph_2SiF_2 (IV) reacted exothermally with primary amines to yield solids far above the m.p. of the components. No ppt. formed when the 2 components were mixed at room temp. in Et_2O or C_6H_6 ; in MeCN an increase in cond. occurred, indicating ion formation. Dry HF added to solns. of PrNH_2 and excess IV in Et_2O , and the mixt. held overnight gave a solid with infrared spectrum identical with III. PrNH_3F (0.238 g.) and 1.5 g. IV reacted exothermally to give 0.338 g. III and 0.063 g. C_6H_6 , indicating cleavage of the Si-Ph bond. No reaction was observed with I and primary amines, and no increase in cond. was obtained in MeCN . When dry HF was added to an Et_2O soln. of I and a primary amine, the only solid product was the alkylammonium fluoride. II and excess dry HF after 20 hrs. at room temp. gave <1% C_6H_6 ; with the triamyl compd. no pentane was formed. Similarly, IV and excess HF gave 44% II and C_6H_6 ; with I and excess HF, all the I was converted to Ph_2SiF_2 , and 43% of this compd. had reacted further to give II.
- CC 39 (Organometallic and Organometalloidal Compounds)

L30 ANSWER 15 OF 15 HCA COPYRIGHT 2004 ACS on STN
46:35375 Original Reference No. 46:6015c-i,6016a Perfluorinated tertiary amines. Kauck, Edward A.; Simons, Joseph H. (Minnesota Mining and Manufacturing Co.). GB 666733 19520220 (Unavailable). APPLICATION: GB .

- AB Tertiary perfluoro-alkyl and cycloalkyl amines of the general formulas $(\text{C}_n\text{F}_{2n+1})_3\text{N}$ (I) and $(\text{C}_n\text{F}_{2n+1})_2\text{N}(\text{CF}_2)_m\text{C}_6\text{F}_{11}$ (II), resp., where n is 1 or a higher integer and need not be the same for each

of the 3 radicals, and m is 0 or 1, are described. The I are obtained in good yield by electrolyzing the corresponding trialkyl amines or substitution products thereof, such as trialkanolamines in liquid **HF** at a cell potential of 4-8 v. and a c.d. of 20 or more amp./sq. ft. of anode surface. The electrolytic cell consists of a Fe or steel container and Ni anode and Fe or steel-cathode plates in an alternating array suspended from a Fe or steel cover and may be provided with a cooling jacket, an upper outlet for gaseous products, an upper inlet for charging materials, and a bottom outlet for liquid products; a suitable gasket and insulating material for electrode mountings and leads is Teflon; the electrolysis is preferably carried out at atm. pressure and at 0.degree.. The liquid reaction products are immiscible with the electrolyte and can be withdrawn from the bottom of the cell. Thus, electrolysis of 175 g. Et3N in 1800 g. com. **anhyd.** **HF** for 25 hrs. at 5.6 v. and a c.d. of 20 amp./sq. ft. anode surface under the above conditions yields 172 g. of and immiscible reaction product which is washed with aq. KOH and H2SO4 and fractionally distd. to give (C2F5)3N, b. 68-9.degree., nD25 1.258, d435 1.708, dielec. const. at 20.degree. 1.86; in another similar run with Et3N an addnl. fraction of (C2F5)2NCF3, b. 45.degree., nD25 1.253, was obtained; this indicates some mol. fragmentation during the electrolysis. The following compds. are similarly prepd. from Bu3N 150 in **HF** 1800 g., electrolyzed for 74 hrs., (C4F9)3N (III), b755.3 177.2.degree., nD25 1.290, d423 1.856, dielec. const. at 20.degree. 2.15; (C5H11)3N (isomeric mixt.) 150 in **HF** 1800 g., electrolyzed for 94 hrs., an isomeric mixt. of (C5F11)3N, b. 215-16.5.degree., nD26 1.301, d425 1.923; Me3N 175 in **HF** 1800 g., electrolyzed for 19 hrs., (CF3)3N, b. -11%, together with CF4, CHF3, and **NF3**; (iso-Pr)2NEt 102 in **HF** 1800 g., electrolyzed for 34 hrs., [(CF3)2CF]2NC2F5, b. 108.degree., nD26 1.298. PhNMe2 (IV), b. 190-5.degree., nD20 1.558, 48 in **anhyd.** **HF** 809 g., electrolyzed for 186 hrs. with the gradual addn. of 23.7 g. IV at 5.0-6.0 v. with 17.8 faradays, gives 135 g. of a cell residue (apart from **HF**), from which 73.7 g. of a fluorocarbon-like liquid is obtained; this is washed with alkali and fractionated to yield C6F11N(CF3)3, b. 110-11.degree., nD20 1.286, d420 1.835. Similarly prepd., by the electrolysis of PhCH2NEt2 (V) 185 in **anhyd.** **HF** 2000 g. for 93 hrs. with the further addn. of V to maintain the initial concn., is C6F11CF2N(C2F5)2, b. 163-5.degree., nD26 1.304, d427 1.892, which solidifies to a glass at 69.degree.. The approx. b.ps. calcd. for (C3F7)3N and (C6F13)3N are 127.degree. and 260.degree., resp. The I are highly stable and unreactive but can react with piperidine and pyridine. Thus, III and piperidine, allowed to stand in a sealed tube at room temp., gives a yellow-orange solid. The I and II do not burn or react with O and can react with K and Na only at elevated temp.; they are colorless

and odorless in the pure form, have exceptionally low b.ps., low n values, dielec. consts., viscosities, and surface tensions; they are unreactive towards concd. HCl, concd. H2SO4, concd. NaOH, 30% H2O2, HNO2, and MeI; they are useful as refrigerants, inert reaction media, solvents, fire-extinguisher fluids, hydraulic-mechanism fluids, heat-transfer media, turbine impellents, transformer liquids, dielectrics, lubricants, and intermediates.

IT 7782-41-4, Fluorine
(compds., manuf. of)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

CC 4 (Electrochemistry)
IT 7782-41-4, Fluorine
(compds., manuf. of)

=> d 131 1-42 cbib abs hitstr hitind

L31 ANSWER 1 OF 42 HCA COPYRIGHT 2004 ACS on STN
139:77223 Cleaning gas for semiconductor device production equipment and cleaning method using the gas. Ohno, Hiromoto; Ohi, Toshio (Showa Denko K.K., Japan). PCT Int. Appl. WO 2003054247 A2 20030703, 16 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-JP13002 20021212. PRIORITY: JP 2001-379401 20011213; US 2002-PV391622 20020627.

AB The present invention provides a cleaning gas for semiconductor devices or equipment for producing semiconductor or liq. crystal devices, comprising a **fluorine gas** contg. 1 vol.% or less of oxygen and/or oxygen-contg. compd. The cleaning gas of the present invention enables an efficient prodn. process of semiconductor device with a high etching rate to improve the cleaning efficiency which ensures excellent cost performance.

IT 7782-41-4, Fluorine, uses
(cleaning **gas**; cleaning gas for semiconductor device
prodn. equipment and cleaning method using the gas)
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

IT 7664-39-3, Hydrogen fluoride, processes
7783-54-2, Nitrogen fluoride (NF3)
(method for **producing** semiconductor device including
decompn. step of decomp. fluoro compd.-contg. gas discharged
from cleaning step)

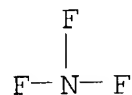
RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C23C016-44

ICS H01L021-00; B08B005-00; H01L021-311; H01L021-3065

CC 76-3 (Electric Phenomena)

Section cross-reference(s): 74

IT 124-38-9, Carbon dioxide, uses 630-08-0, Carbon monoxide, uses
7732-18-5, Water, uses 7782-41-4, Fluorine, uses
7782-44-7, Oxygen, uses 7783-41-7, Oxygen difluoride 7783-44-0,
Oxygen fluoride (O2F2) 10024-97-2, Nitrogen oxide (N2O), uses
10102-43-9, Nitrogen oxide (NO), uses 10102-44-0, Nitrogen
dioxide, uses 16829-28-0, Oxygen fluoride (O3F2)
(cleaning **gas**; cleaning gas for semiconductor device
prodn. equipment and cleaning method using the gas)

IT 75-73-0, Carbon fluoride (CF4) 7664-39-3, Hydrogen
fluoride, processes 7783-54-2, Nitrogen
fluoride (NF3) 7783-61-1, Silicon fluoride
(SiF4) 7783-82-6, Tungsten fluoride (WF6)
(method for **producing** semiconductor device including
decompn. step of decomp. fluoro compd.-contg. gas discharged
from cleaning step)

L31 ANSWER 2 OF 42 HCA COPYRIGHT 2004 ACS on STN

138:92253 Production of high-purity **fluorine gas** and

analysis of trace impurities. Torisu, Junichi; Atobe, Hitoshi;

Hoshino, Yasuyuki (Showa Denko K. K., Japan). PCT Int. Appl. WO 2003002454 A2 20030109, 42 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2002-JP6519 20020627. PRIORITY: JP 2001-199437 20010629; JP 2001-199731 20010629; US 2001-PV306421 20010720; US 2001-PV306422 20010720.

- AB High-purity **fluorine gas** is produced by heating a fluoronickel compd. to 250-600.degree.C and reducing the pressure inside the container to .ltoreq. 0.01 MPa to release a **fluorine gas**, followed by occluding the released **fluorine gas** reduced in the HF content to .ltoreq. 500 vol. ppm into a fluorinated compd. The steps of occlusion and release of **fluorine gas** are repeated several times to yield a **fluorine gas** of at least 99.99 vol.% purity with an O2 and CO2 content of .ltoreq. 10 vol. ppm, resp. The fluoronickel compd. can be K3NiF5, K3NiF6, or K3NiF7. For the anal. of trace impurities the fluoronickel compd. is heated at reduced pressure in a container having a fluorinated layer formed on its surface to allow a **fluorine gas** reduced in HF content to be occluded into the fluoronickel compd., followed by analyzing the impurities by gas chromatog. The trace impurities can be H2, O2, N2, CH4, CO, CO2, CF4, SF6, **NF3**, He, Ne, Ar, Kr, and Xe. Trace impurities, such as CH4, CO, CO2, CF4, SF6, **NF3**, **HF**, H2O, and F2O can be analyzed by IR spectroscopy by introducing an impurity contg. **fluorine gas** into a cell with a CaF2 window.
- IT 7782-41-4P, Fluorine, preparation
(high-purity; prodn. of high-purity **fluorine gas** and anal. of trace impurities)
- RN 7782-41-4 HCA
- CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

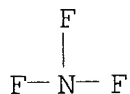
- IT 7664-39-3, Hydrofluoric acid, processes 7783-54-2, Nitrogen fluoride (NF3)
(prodn. of high-purity **fluorine gas** and anal. of trace impurities)
- RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C01B007-20

ICS C01G053-08; G01N030-14; G01N021-35; H01S003-225

CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 76, 79, 80

IT Absorption

Gas chromatography

IR spectroscopy

Impurities

Trace analysis

(prodn. of high-purity **fluorine gas** and anal.
of trace impurities)

IT 7782-41-4P, Fluorine, preparation

(high-purity; prodn. of high-purity **fluorine gas** and anal. of trace impurities)

IT 74-82-8, Methane, processes 75-73-0, Carbon fluoride (CF4)
124-38-9, Carbon dioxide, processes 630-08-0, Carbon monoxide,
processes 1333-74-0, Hydrogen, processes 2551-62-4, Sulfur
fluoride (SF6) 7439-90-9, Krypton, processes 7440-01-9, Neon,
processes 7440-37-1, Argon, processes 7440-59-7, Helium,
processes 7440-63-3, Xenon, processes **7664-39-3**,
Hydrofluoric acid, processes 7727-37-9, Nitrogen, processes
7732-18-5, Water, processes 7782-44-7, Oxygen, processes
7783-41-7, Fluorine oxide (F2O) **7783-54-2**,

Nitrogen fluoride (NF3)

(prodn. of high-purity **fluorine gas**
and anal. of trace impurities)

IT 14881-07-3 67415-55-8 80164-68-7

(prodn. of high-purity **fluorine gas** and anal.
of trace impurities)

IT 7789-75-5, Calcium fluoride (CaF2), uses

(window material of IR cell; prodn. of high-purity
fluorine gas and anal. of trace impurities)

L31 ANSWER 3 OF 42 HCA COPYRIGHT 2004 ACS on STN

138:9831 Low dielectric constant material and method of processing by

CVD. O'Neill, Mark Leonard; Peterson, Brian Keith; Vincent, Jean Louise; Vrtis, Raymond Nicholas (Air Products and Chemicals, Inc., USA). Eur. Pat. Appl. EP 1260606 A2 20021127, 20 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR. (English). CODEN: EPXXDW. APPLICATION: EP 2002-10229 20020516. PRIORITY: US 2001-863150 20010523.

AB Organofluorosilicate glass films contain both org. species and inorg. fluorines, exclusive of significant amts. of fluorocarbon species. Preferred films are $\text{Si}_v\text{O}_w\text{C}_x\text{H}_y\text{F}_z$, where $v+w+x+y+z = 100\%$, v is 10-35 at.%, w is 10-65 at.%, y is 10-50 at.%, x is 1-30 at.%, z is 0.1-15 at.%, and x/z is optionally >0.25 , wherein substantially none of the fluorine is bonded to the C. A CVD method includes: (a) providing a substrate within a vacuum chamber; (b) introducing into the vacuum chamber gaseous reagents including a **fluorine** -providing **gas**, an oxygen-providing gas and at least one precursor gas selected from an organosilane and an organosiloxane; and (c) applying energy to the gaseous reagents in the chamber to induce reaction of the gaseous reagents and to form the film on the substrate.

IT 7664-39-3, Hydrogen fluoride, processes
7782-41-4, Fluorine, processes
7783-54-2, Nitrogen fluoride (NF3)

(CVD method of producing organofluorosilicate glass films having low dielec. const.)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

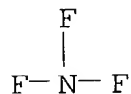
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C23C016-30

ICS C23C016-40; C03C003-062; H01L021-316

CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 76
IT 75-76-3, Tetramethylsilane 78-10-4, Tetraethoxysilane 78-62-6,
Dimethyldiethoxysilane 353-66-2, Difluorodimethylsilane
358-60-1, Fluorotriethoxysilane 373-74-0, Methyltrifluorosilane
420-56-4, Fluorotrimethylsilane 542-91-6, Diethylsilane
694-53-1, Phenylsilane 766-08-5, Methylphenylsilane 992-94-9,
Methylsilane 993-07-7, Trimethylsilane 998-30-1, Triethoxysilane
1111-74-6, Dimethylsilane 1112-39-6, Dimethyldimethoxysilane
1529-17-5, Trimethylphenoxysilane 2031-62-1, Methyltriethoxysilane
2488-01-9, 1,4-Bis(dimethylsilyl)benzene 2551-62-4, Sulfur
hexafluoride 2814-79-1, Ethylsilane 4364-07-2 5654-04-6
5833-47-6, 1,1-Dimethyl-1-sila-2-oxacyclohexane 7381-30-8,
1,2-Bis(trimethylsiloxy)ethane 7637-07-2, Boron fluoride (BF₃),
processes 7664-39-3, Hydrogen fluoride
, processes 7722-84-1, Hydrogen peroxide, processes
7782-41-4, Fluorine, processes
7782-44-7, Oxygen, processes 7783-54-2, Nitrogen
fluoride (NF₃) 7783-60-0, Sulfur fluoride (SF₄)
7783-61-1, Silicon fluoride (SiF₄) 7787-71-5, Bromine fluoride
(BrF₃) 7790-91-2, Chlorine fluoride (ClF₃) 10024-97-2, Nitrogen
oxide (N₂O), processes 10028-15-6, Ozone, processes 10102-43-9,
Nitrogen oxide (NO), processes 10102-44-0, Nitrogen dioxide,
processes 10544-72-6, Nitrogen oxide (N₂O₄) 13465-71-9
13537-33-2 13637-87-1, Nitrogen chloride fluoride (NClF₂)
13824-36-7 14857-34-2, Dimethylethoxysilane 14879-83-5
17082-61-0, 1,2-Bis(trimethylsiloxy)cyclobutene 18139-76-9,
Phenoxysilane 18162-96-4, Cyclohexylsilane 18165-85-0,
tert-Butylsilane 25711-12-0 476608-55-6
(CVD method of producing organofluorosilicate glass
films having low dielec. const.)

L31 ANSWER 4 OF 42 HCA COPYRIGHT 2004 ACS on STN

137:359476 Method for preparing nitrogen

trifluoride NF₃ by electrolysis and installation
therefor. Saab, Waddah; Combet, Michel; Martinez, Eric; Nicolas,
Francois (Societe Pour La Conversion De L'Uranium En Metal Et
Hexafluorure (Comurhex), Fr.). PCT Int. Appl. WO 2002090620 A2
20021114, 37 pp. DESIGNATED STATES: W: CA, CN, KR, RU, US, ZA; RW:
AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT,
SE, TR. (French). CODEN: PIXXD2. APPLICATION: WO 2002-FR1546
20020506. PRIORITY: FR 2001-6070 20010507.

AB The invention concerns a method for prepg.
nitrogen trifluoride by electrolysis comprising
NH₄F and hydrofluoric acid HF (NH₄F, xHF) with at least a
carbon anode of such quality as to prevent passivation and
disintegration thereof or a nickel anode, wherein, when the anode is
made of carbon: the electrolytic soln. NH₄F, xHF is such that x

ranges between 0.95 and 1.45, that is 34 to 44 % of free **HF** mass; the temp. of the soln. ranging between 115 and 140.degree.; the c.d. being 5 to 15 A/dm²; the electrolysis voltage being 5.8 to 9.0 V ; and when the anode is made of nickel: the electrolytic soln. **NH₄F**, x**HF** is such that x ranges between 1.4 and 1.6, that is 43 to 46 % of free **HF** mass; the temp. of the soln. between 105 and 125.degree.; the c.d. is between 6 and 12 A/dm²; the electrolysis voltage between 5.5 and 8.5 V.

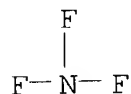
IT 7664-39-3, **Hydrogen fluoride**, reactions
 (app. for **prepg. NF₃** by electrolysis of
 (NH₄)F and **HF** mixt.)
 RN 7664-39-3 HCA
 CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4, **Fluorine**, reactions
 (formation as byproduct in process of **prepn.** of
NF₃ by electrolysis of (NH₄)F and **HF** mixt.)
 RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IT 7783-54-2P, **Nitrogen trifluoride**
 (**prepg.** by electrolysis and installation therefor)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C25B
 CC 72-9 (Electrochemistry)
 Section cross-reference(s): 48, 49, 66
 ST **prepg nitrogen trifluoride**
 electrolysis impurities adsorption distn
 IT Electrolysis
 (app. for **prepg. NF₃** by)
 IT Reactors
 (for **prepg. NF₃** by electrolysis)
 IT Current density
 Electric potential
 (for **prepg. NF₃** by electrolysis of (NH₄)F and

HF mixt.)

- IT Adsorbents
Cryogenics
Distillation
(use for purifn. of **NF3** prepd. by electrolysis of $(\text{NH}_4)\text{F}$ and **HF** mixt.)
- IT 7440-44-0, Carbon, uses
(anode in electrolyzer for **prepg. NF3** by electrolysis of $(\text{NH}_4)\text{F}$ and **HF** mixt.)
- IT 7440-02-0, Nickel, uses
(anode in electrolyzer for **prepg. NF3** by electrolysis of $(\text{NH}_4)\text{F}$ and **HF** mixt. and adsorbent of byproduct impurities)
- IT 7664-39-3, Hydrogen fluoride, reactions
12125-01-8, Ammonium fluoride
(app. for **prepg. NF3** by electrolysis of $(\text{NH}_4)\text{F}$ and **HF** mixt.)
- IT 12597-69-2, Steel, uses
(cathode in electrolyzer for **prepg. NF3** by electrolysis of $(\text{NH}_4)\text{F}$ and **HF** mixt.)
- IT 7782-41-4, Fluorine, reactions
(formation as byproduct in process of **prepn.** of **NF3** by electrolysis of $(\text{NH}_4)\text{F}$ and **HF** mixt.)
- IT 7783-54-2P, Nitrogen trifluoride
(**prepg.** by electrolysis and installation therefor)
- IT 7429-90-5, Aluminum, reactions
(use as adsorbent of **F2** for purifn. of **NF3** prepd. by electrolysis of $(\text{NH}_4)\text{F}$ and **HF** mixt.)
- IT 7681-49-4, Sodium fluoride, uses
(use as adsorbent of **HF** for purifn. of **NF3** prepd. by electrolysis of $(\text{NH}_4)\text{F}$ and **HF** mixt.)
- IT 7440-50-8, Copper, reactions
(use as adsorbent of byproduct impurities for purifn. of **NF3** prepd. by electrolysis of $(\text{NH}_4)\text{F}$ and **HF** mixt.)

L31 ANSWER 5 OF 42 HCA COPYRIGHT 2004 ACS on STN

137:240609 Semiconductor devices and fabrication of devices thereof for fine precision patterning. Matsubara, Hirokazu (Hitachi Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2002261043 A2 20020913, 15 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-60426 20010305.

AB The title fabrication involves (1) forming on a semiconductor substrate with a material to be etched, (2) providing a mask pattern over the material to be etched, and (3) dry etching the material over the patterned mask with an etchant gas and a polymer-deposition gas so as to remove the material other than masked regions at a condition to deposit the polymer as an etching barrier on the top and sidewall of the mask. The process makes possible for formation

of gate electrodes and patterned circuits in patterning resolu.
 .ltoreq.200 nm at high aspect ratio.

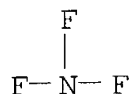
IT 7664-39-3, **Hydrogen fluoride**, reactions
 7782-41-4, Fluorine, reactions 7783-54-2,
Nitrogen fluoride (NF3)
 (semiconductor devices and **fabrication** of devices
 thereof for fine precision patterning)
 RN 7664-39-3 HCA
 CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01L021-28
 ICS H01L021-28; H01L021-3065; H01L021-3213; H01L021-338;
 H01L029-812; H01L029-778
 CC 76-3 (Electric Phenomena)
 IT 74-82-8, Methane, reactions 75-09-2, Methylene chloride, reactions
 75-10-5, Difluoromethane 75-46-7, Fluoroform 1333-74-0,
 Hydrogen, reactions 7647-01-0, Hydrogen chloride, reactions
 7664-39-3, **Hydrogen fluoride**, reactions
 7782-41-4, Fluorine, reactions 7782-50-5, Chlorine,
 reactions 7783-54-2, **Nitrogen fluoride**
 (NF3)
 (semiconductor devices and **fabrication** of devices
 thereof for fine precision patterning)

L31 ANSWER 6 OF 42 HCA COPYRIGHT 2004 ACS on STN
 134:303333 Beads of polycrystalline alkali-metal or alkaline-earth metal
 fluoride, their preparation and their use. Mayolet, Alexandre;
 Pell, Michael (Corning Incorporated, USA). PCT Int. Appl. WO
 2001025001 A1 20010412, 21 pp. DESIGNATED STATES: W: AE,
 AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU,
 CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,

IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE.
(English). CODEN: PIXXD2. APPLICATION: WO 2000-US26439 20000926.
PRIORITY: FR 1999-12386 19991005.

AB The present invention has the following objectives: polycryst. alkali-metal or alk.-earth metal (more particularly CaF_2) fluorides, produced in an original form, as beads; said beads having a diam. or equiv. diam. greater than or equal to 100 μm , advantageously between 100 μm and 2 cm and an apparent d. greater than or equal to 60 %, advantageously at least 90 % of the theor. d. of said fluoride; a process for the prepn. (the conditioning) of said fluorides; a process for the prepn. of single crystals of the corresponding alkali-metal or alk.-earth metal fluorides that uses polycryst. fluorides in the aforementioned original form.

IT 7664-39-3, Hydrogen fluoride, processes
7782-41-4, Fluorine, processes
7783-54-2, Nitrogen fluoride (NF3)

(prepn. of beads of polycryst. alkali-metal or alk.-earth metal fluoride, carried out under fluorinating atm., intervened by)

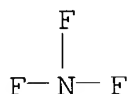
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM B32B005-16
ICS C01B009-08; C01D003-02; C01F005-28
CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 73, 74
IT 7664-39-3, Hydrogen fluoride, processes

7782-41-4, Fluorine, processes7783-46-2, Lead fluoride (PbF₂) **7783-54-2,****Nitrogen fluoride (NF₃)** 9002-84-0,Polytetrafluoroethylene 12125-01-8, Ammonium fluoride (NH₄F)

118933-11-2

(prepn. of beads of polycryst. alkali-metal or
 alk.-earth metal fluoride, carried out under fluorinating atm.,
 intervened by)

L31 ANSWER 7 OF 42 HCA COPYRIGHT 2004 ACS on STN

134:6607 Apparatus for **manufacture of nitrogen**

trifluoride. Tarancon, Gregorio (Florida Scientific
 Laboratories Inc., USA). PCT Int. Appl. WO 2000073201 A2

20001207, 47 pp. DESIGNATED STATES: W: AT, AU, BR, CA, CN,
 CZ, DE, DK, ES, FI, GB, HU, ID, IL, IS, JP, KP, KR, LU, MX, NO, NZ,
 PL, PT, RO, RU, SE, SG, TR, UA, VN; RW: AT, BE, CH, CY, DE, DK, ES,
 FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN:
 PIXXD2. APPLICATION: WO 1999-US11635 19990526.

AB App. is disclosed for the **manuf. of nitrogen**

trifluoride (NF₃), starting with an anhyd. molten
 flux including ammonia (NH₃), a metal fluoride (MF), and
hydrogen fluoride (HF). The app.

includes an electrolyzer, an ammonia solubilizer, a **hydrogen**
fluoride solubilizer, a **nitrogen**

trifluoride reactor, two compressors, two pumps, three
 condensers, a gas recycle loop, and two flux loops of the same
 component ternary flux, but each loop having a different concn.

IT **7782-41-4, Fluorine, uses**

(app. for **manuf. of nitrogen**
trifluoride)

RN 7782-41-4 HCA

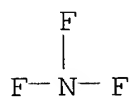
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

IT **7783-54-2P, Nitrogen trifluoride**

(app. for **manuf. of nitrogen**
trifluoride)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)IT **7664-39-3, Hydrogen fluoride, processes**

(app. for manuf. of nitrogen
trifluoride)

RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IC ICM C01B
CC 49-5 (Industrial Inorganic Chemicals)
Section cross-reference(s): 47
ST app nitrogen trifluoride manuf
IT Apparatus
Compressors
Condensers
Electrolytic cells
Gases
Pumps
Reactors

(app. for manuf. of nitrogen
trifluoride)

IT 1333-74-0, Hydrogen, uses 7440-02-0, Nickel, uses
7782-41-4, Fluorine, uses
(app. for manuf. of nitrogen
trifluoride)

IT 7783-54-2P, Nitrogen trifluoride
(app. for manuf. of nitrogen
trifluoride)

IT 7664-39-3, Hydrogen fluoride, processes
7664-41-7, Ammonia, processes
(app. for manuf. of nitrogen
trifluoride)

L31 ANSWER 8 OF 42 HCA COPYRIGHT 2004 ACS on STN

133:303837 Manufacture of optical thin film and optical parts involving
the film. Suzuki, Yasuyuki; Ando, Kenji; Ohtani, Minoru; Biro,
Ryuji; Kanazawa, Hidehiro (Canon Inc., Japan). Jpn. Kokai Tokkyo
Koho JP 2000297366 A2 20001024, 8 pp. (Japanese). CODEN:
JKXXAF. APPLICATION: JP 1999-102955 19990409.

AB A metal fluoride thin film with high quality, i.e., low n
(.ltoreq.1.45) and no absorption in visible light and UV regions, is
formed by sputtering. When, the optical fluoride film, e.g., MgF2,
is formed on a substrate by sputtering a metal target by a F
-contg. gas, H2O and/or H gas(es) are used in addn. to the
F-contg. gas. Active F is converted into
HF because of the H2O layer adsorbed on the substrate, and
the residence time of active F on the substrate is prolonged so that
F and metal particles from the target react efficiently and that the

optical film with stoichiometry is formed. A d.c. voltage is supplied to the metal target and a reverse potential is superimposed to it to prevent generation of an abnormal discharge.

IT 7664-39-3, Hydrogen fluoride, processes

7782-41-4, Fluorine, processes

7783-54-2, Nitrogen trifluoride

(formation of metal fluoride optical film with stoichiometry by sputtering using fluorine assocd. with water or hydrogen)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

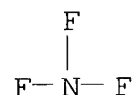
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C23C014-34

ICS G02B001-10; G02B005-08

CC 75-1 (Crystallography and Liquid Crystals)

Section cross-reference(s): 73

ST metal fluoride optical thin film sputtering; **fluorine**

gas sputtering metal target conversion; **hydrogen**

fluoride formation fluorine water sputtering; stoichiometry

fluoride sputtering **hydrogen fluoride**; low

refractive index optical thin film; visible light absorption optical

thin film; UV absorption optical thin film

IT 1333-74-0, Hydrogen, processes 7664-39-3, Hydrogen

fluoride, processes 7732-18-5, Water, processes

7782-41-4, Fluorine, processes

7783-54-2, Nitrogen trifluoride

(formation of metal fluoride optical film with stoichiometry by sputtering using fluorine assocd. with water or hydrogen)

132:57884 Production method of a semiconductor device with dual gate oxide layers.. Kawai, Kenji; Yonekura, Kazumasa (Mitsubishi Denki K.K., Japan). Ger. Offen. DE 19857095 A1 **19991223**, 34 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1998-19857095 19981210. PRIORITY: JP 1998-167160 19980615.

AB A relatively thick gate oxide layer and a relatively thin gate oxide layer are deposited on the surface of a semiconductor. In an area immediately below the thick gate oxide layer, a halogen is added that is confined to a depth of not more than 2 nm from the main surface of the silicon substrate. Accordingly, a semiconductor device can be made with a dual-gate oxide and a prodn. method is described involving the redn. of the damage of the substrate by a simplified procedure.

IT 7664-39-3, Hydrogen fluoride, processes
7782-41-4, Fluorine, processes
7783-54-2, Nitrogen trifluoride

(prodn. method of a semiconductor device with dual gate oxide layers)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

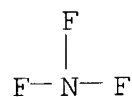
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01L027-088

CC 76-3 (Electric Phenomena)

IT 2551-62-4, Sulfur hexafluoride 7647-01-0, Hydrochloric acid, processes 7664-39-3, Hydrogen fluoride, processes 7782-41-4, Fluorine, processes 7782-50-5, Chlorine, processes 7783-54-2, Nitrogen trifluoride 7790-91-2, Chlorine trifluoride 10294-34-5, Boron trichloride (prodn. method of a semiconductor device with dual gate oxide layers)

L31 ANSWER 10 OF 42 HCA COPYRIGHT 2004 ACS on STN

131:358011 Method for preparing thin films of fluorinated compounds used in optics and thin films thus prepared. Quesnel, Etienne; Robic, Jean Yves; Rolland, Bernard (Commissariat a l'Energie Atomique, Fr.). Fr. Demande FR 2773175 A1 **19990702**, 33 pp. (French). CODEN: FRXXBL. APPLICATION: FR 1997-16793 19971231.

AB The invention concerns a method of prepn. of .gtoreq.1 fluorinated compd. layer under vacuum deposition in which , simultaneously, with the operation of vacuum deposition, one introduces in the gas phase .gtoreq.1 reductive chem. species and **F2**, to realize the fluorination deposit of the fluorinated compd. The invention equally concerns thin layers and multilayers thus prepd. These multilayers on a substrate are able to ensure mirror optical function, spectral filters or antireflection coatings, in the UV-IR spectral domain and play a protective coating role of optical components against intense laser fluxes or against corrosive atmospheres.

IT **7782-41-4DP**, Fluorine, compds., uses
(method for prepg. thin films of fluorinated compds. used in optics and thin films thus prepd.)

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

IT **7664-39-3**, Hydrogen fluoride, processes
7782-41-4, Fluorine, processes
7783-54-2, Nitrogen trifluoride
(method for prepg. thin films of fluorinated compds. used in optics and thin films thus prepd.)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

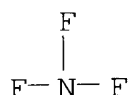
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



- IC ICM C23C016-28
ICS C23C014-06; C23C016-08; C23C016-30; G02B001-10
- CC 73-12 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75
- IT **7782-41-4DP**, Fluorine, compds., uses 7784-18-1P, Aluminum trifluoride 7789-24-4P, Lithium fluoride, uses 13709-49-4P, Yttrium trifluoride
(method for prepg. thin films of fluorinated compds. used in optics and thin films thus prepd.)
- IT 75-73-0, Carbon tetrafluoride 1333-74-0, Hydrogen, processes 2551-62-4, Sulfur hexafluoride **7664-39-3**, **Hydrogen fluoride**, processes **7782-41-4**, **Fluorine**, processes **7783-54-2**, **Nitrogen trifluoride** 12125-01-8, Ammonium fluoride 14762-94-8, Atomic fluorine, processes
(method for prepg. thin films of fluorinated compds. used in optics and thin films thus prepd.)
- L31 ANSWER 11 OF 42 HCA COPYRIGHT 2004 ACS on STN
131:312145 Reactive matrix for moisture removal from **nitrogen trifluoride** or fluorine. Snow, James T. (Millipore Corporation, USA). PCT Int. Appl. WO 9955620 A1 **19991104**, 12 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1999-US8775 19990421. PRIORITY: US 1998-69432 19980429.
- AB Moisture is removed from a **NF3** or **F2** gas by contacting the gas with Al₂O₃ particles coated with AlF₃. The AlF₃ is formed by reacting Al₂O₃ particles with an aq. soln. of **HF**.
- IT **7664-39-3**, **Hydrogen fluoride**, processes
(AlF₃-coated alumina particles for moisture removal from **NF3** or **F2**)
- RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4P, Fluorine, processes
7783-54-2P, Nitrogen trifluoride
(AlF3-coated alumina particles for moisture removal from
NF3 or F2)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)

F
|
F-N- F

IC ICM C01B021-083
CC 48-1 (Unit Operations and Processes)
Section cross-reference(s): 49
ST **nitrogen trifluoride** moisture removal AlF3
alumina; fluorine moisture removal AlF3 alumina; aluminum
trifluoride moisture removal gas
IT 1344-28-1, Alumina, processes **7664-39-3, Hydrogen
fluoride**, processes 7784-18-1, Aluminum trifluoride
(AlF3-coated alumina particles for moisture removal from
NF3 or F2)
IT 7782-41-4P, Fluorine, processes
7783-54-2P, Nitrogen trifluoride
(AlF3-coated alumina particles for moisture removal from
NF3 or F2)

L31 ANSWER 12 OF 42 HCA COPYRIGHT 2004 ACS on STN
131:148275 Impact of fluorine from **NF3** based chamber cleaning
processes. Brown, Paul Thomas; Mendicino, Laura; Vartanian, Victor
(Motorola, Austin, TX, 78721, USA). Proceedings - Electrochemical
Society, 99-8 (Environmental Issues in the Electronics and
Semiconductor Industries), 52-59 (English) **1999**. CODEN:
PESODO. ISSN: 0161-6374. Publisher: Electrochemical Society.

AB The use and emissions of perfluorocompounds (PFCs) in the
semiconductor manufg. industry has received significant attention
over the past 5 yr. Focused efforts to evaluate various
technologies to reduce these emissions have been underway for the
last 3-4 yr. Chamber cleans utilizing **NF3** as the primary

fluorine source have been shown to greatly reduce PFC emissions from the thin films area of a fab. Both in-situ and remote plasma chamber cleaning have been demonstrated by various semiconductor manufg. companies, and both are supported by various industry equipment suppliers. Both techniques will likely play a significant role in long term PFC emissions redn. The dissocn. of **NF3** in the in-situ or remote plasma system leads to formation of various fluorinated reaction byproducts. These byproducts can pose substantial challenges to meeting federal, state, and local limits on emissions of fluoride to the air and to wastewater streams. As **NF3** chamber cleaning proliferates, semiconductor fabs that are already straining to meet low limits on HAP (hazardous air pollutant) emissions to the air and fluoride discharge to the local POTW may face unanticipated capital expenditure requirements to maintain compliance. Based on 25,000 lb or annual **NF3** usage for a typical 200 mm fab, the boundary condition (worst case) air and wastewater impacts are 10.6 TPY and 4.6 mg/l, resp., over current levels. Under most conditions, it is desirable to transfer the fluoride from the air stream to wastewater, thereby diminishing or eliminating the HAPs problem. The increased fluorine contributions to water may be manageable for single fab sites, but will likely require addnl. fluoride treatment infrastructure for multiple fab sites or sites with very low fluoride in wastewater limits. A thorough understanding of the characteristics and quantity of fluoride emissions is imperative to successfully address this challenge.

IT 7664-39-3, **Hydrogen fluoride**, occurrence
(emission of; fluorine emissions from **NF3** based chamber
cleaning processes)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4D, **Fluorine, compds.**, occurrence 7783-54-2
, **Nitrogen fluoride (NF3)**
(fluorine emissions from **NF3** based chamber cleaning
processes)

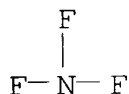
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



- CC 59-2 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 60, 61, 76
- ST **fluorine atm emission nitrogen**
fluoride chamber cleaning semiconductor **manuf**;
semiconductor thin film chamber cleaning fluoronitrogen
perfluorocompd emission
- IT Fluorides, occurrence
(atm. emissions and wastewater discharges of; fluorine emissions
from **NF3** based chamber cleaning processes)
- IT Air pollution
(control; fluorine emissions from **NF3** based chamber
cleaning processes)
- IT Wastewater
(fluorides in; fluorine emissions from **NF3** based
chamber cleaning processes)
- IT Air pollution
Semiconductor materials
(fluorine emissions from **NF3** based chamber cleaning
processes)
- IT Standards, legal and permissive
(for fluoride atm. emissions and wastewater discharges; fluorine
emissions from **NF3** based chamber cleaning processes)
- IT Plasma
(remote, chamber cleaning; fluorine emissions from **NF3**
based chamber cleaning processes)
- IT **7664-39-3, Hydrogen fluoride**, occurrence
7783-61-1, Silicon tetrafluoride
(emission of; fluorine emissions from **NF3** based chamber
cleaning processes)
- IT **7782-41-4D, Fluorine, compds.**, occurrence **7783-54-2**
, Nitrogen fluoride (NF3)
(fluorine emissions from **NF3** based chamber cleaning
processes)
- L31 ANSWER 13 OF 42 HCA COPYRIGHT 2004 ACS on STN
130:46344 Nitrided oxide film and its manufacture. Saito, Hiroshi
(Central Glass Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP
10321620 A2 **19981204** Heisei, 6 pp. (Japanese). CODEN:
JKXXAF. APPLICATION: JP 1997-130599 19970521.
- AB In the film, N concn. decreases from the surface part to the depth
direction. The film may contain F. The film is manufd. by
fluorinating an oxide film with a F compd. and nitriding with a N
compd. The film is useful as elec. insulating films in manuf. of

semiconductor integrated circuits. The film showed improved elec. property and high barrier property to B impurity diffusion.

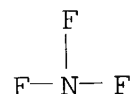
IT 7664-39-3, **Hydrogen fluoride**, uses
7782-41-4, Fluorine, uses 7783-54-2,
Nitrogen trifluoride
(manuf. of nitrided oxide elec. insulating film with
fluorination)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01L021-318
ICS C23C008-02; C23C008-34; H01L021-31
CC 76-10 (Electric Phenomena)
IT 75-73-0, Tetrafluoromethane 76-16-4, Hexafluoroethane 2551-62-4,
Sulfur hexafluoride 7664-39-3, **Hydrogen**
fluoride, uses 7782-41-4, Fluorine, uses
7783-54-2, **Nitrogen trifluoride**
7783-66-6, Iodine pentafluoride 7787-71-5, Bromine trifluoride
7789-30-2, Bromine pentafluoride 7790-89-8, Chlorine fluoride
(ClF) 7790-91-2, Chlorine trifluoride 13637-63-3, Chlorine
pentafluoride 16921-96-3, Iodine heptafluoride 22520-96-3,
Iodine trifluoride 59680-92-1, Bromine fluoride
(manuf. of nitrided oxide elec. insulating film with
fluorination)

L31 ANSWER 14 OF 42 HCA COPYRIGHT 2004 ACS on STN
130:46201 Production method of semiconductor device.. Yamazaki, Shunpei
(Semiconductor Energy Laboratory Co., Ltd. (SEL), Japan). Jpn.
Kokai Tokyo Koho JP 10321526 A2 19981204 Heisei, 9 pp.
(Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-144665 19970519.
AB The title method involves forming an amorphous Si film on a

substrate having an insulator surface by a Hg-sensitized CVD, forming a cryst. Si film using a catalyst for promoting the crystn., and heat treating in an atm. contg. a halogen element to getter the Hg. Specifically, the catalyst may comprise Ni, Fe, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and/or Au, and the atm. may contain HCl, **HF**, HBr, Cl₂, ClF₃, BCl₃, **NF₃**, **F₂**, and/or Br₂.

IT 7664-39-3, **Hydrogen fluoride**, uses
7782-41-4, Fluorine, uses 7783-54-2,
Nitrogen fluoride (NF₃)
(semiconductor device **fabrication** by mercury gettering
in atm. contg.)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

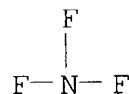
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01L021-205

CC 76-3 (Electric Phenomena)
Section cross-reference(s): 74

IT 7647-01-0, Hydrogen chloride, uses 7664-39-3,
Hydrogen fluoride, uses 7726-95-6, Bromine, uses
7782-41-4, Fluorine, uses 7782-50-5, Chlorine, uses
7783-54-2, **Nitrogen fluoride (**
NF₃) 7790-91-2, Chlorine fluoride (ClF₃) 10035-10-6,
Hydrogen bromide, uses 10294-34-5, Boron chloride (BCl₃)
(semiconductor device **fabrication** by mercury gettering
in atm. contg.)

L31 ANSWER 15 OF 42 HCA COPYRIGHT 2004 ACS on STN
129:128684 Excimer lasers. Clean gases give more power. Bierhals,
Juergen; Hamm, Rainer; Schroeder, Georg (Germany). Gas Aktuell, 55,
17-22 (German) 1998. CODEN: GAAKDX. ISSN: 0340-6067.
Publisher: Messer Griesheim GmbH.

AB The influence of the gas quality on the laser efficiency of 2 excimer lasers, a 1 W ArF-laser for medical and a 100 W ArF laser for tech. applications, were investigated. The used gas mixts. contain **F2**/He mixts. with Ne and Ar. The gaseous pollutants (CO₂, CF₄, SiF₄, **HF**) were detd. before and after laser action depending on their residence time. In a gas mixt. that contains N₂, the **formation** of **NF3** was also detd.

IT 7782-41-4, **Fluorine**, uses
 (gas quality effect on excimer laser efficiency studied
 by pollutant detection via IR spectra)
 RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F— F

IT 7664-39-3, Hydrofluoric acid, properties
 (gas quality effect on excimer laser efficiency studied by
 pollutant detection via IR spectra)
 RN 7664-39-3 HCA
 CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2, **Nitrogen trifluoride**
 (gas quality effect on excimer laser efficiency studied by
 pollutant detection via IR spectra)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

F
 |
 F— N— F

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
 IT 7440-37-1, Argon, uses 7727-37-9, Nitrogen, uses 7782-41-4
 , **Fluorine**, uses
 (gas quality effect on excimer laser efficiency studied
 by pollutant detection via IR spectra)
 IT 56-23-5, Tetrachloromethane, properties 124-38-9, Carbon dioxide,
 properties 7664-39-3, Hydrofluoric acid, properties
 10026-04-7, Tetrachlorosilane
 (gas quality effect on excimer laser efficiency studied by
 pollutant detection via IR spectra)

IT 7783-54-2, Nitrogen trifluoride

(gas quality effect on excimer laser efficiency studied by pollutant detection via IR spectra)

L31 ANSWER 16 OF 42 HCA COPYRIGHT 2004 ACS on STN

129:128237 Electrolyzer. Tarancon, Gregorio (Florida Scientific Laboratories Inc., USA). U.S. US 5779866 A 19980714, 18 pp. (English). CODEN: USXXAM. APPLICATION: US 1996-757619 19961126.

AB An electrolyzer, including a lower electrolyte chamber for receiving liq. electrolyte flux and having disposed therein anode and cathode electrodes for producing anodic and cathodic gases. A first barrier is disposed in the lower electrolyte chamber between the anode and cathode electrodes having a plurality of V-shaped passageways for allowing the passage of electrons but for preventing the recombination of anodic and cathodic gases. The electrolyzer also includes an upper gas chamber having an anodic gas compartment and a cathodic gas compartment for receiving therein the anodic and cathodic gases produced in the lower electrolyte chamber. The upper gas chamber includes a second barrier disposed between the anodic and cathodic gas compartments having no passageways in order to prevent the recombination of anodic and cathodic gases. The second barrier is connected to the first barrier. In addn., the electrolyzer further includes means for transferring the anodic and cathodic gases produced in the anodic and cathodic gas compartments to holding tanks for storing of the anodic and cathodic gases.

IT 7782-41-4P, Fluorine, preparation 7783-54-2P, Nitrogen trifluoride

(electrolyzer having an upper chamber receiving anodic gas which is an oxidizer gas selecting from F₂, Cl₂, O₂, O₃, and NF₃)

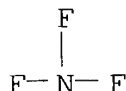
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7664-39-3, Hydrogen fluoride, uses

(electrolyzer having binary electrolyte flux contg. HF and KF)

RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IC ICM C25B009-00
ICS C25B015-08

NCL 204262000

CC 72-3 (Electrochemistry)
Section cross-reference(s): 49

ST electrolytic cell halogen oxygen ozone prodn; **nitrogen**
trifluoride prodn

IT 7782-41-4P, Fluorine, preparation 7782-44-7P, Oxygen,
preparation 7782-50-5P, Chlorine, preparation 7783-54-2P
, **Nitrogen trifluoride** 10028-15-6P, Ozone,
preparation

(electrolyzer having an upper chamber receiving anodic gas which
is an oxidizer gas selecting from **F2**, Cl2, O2, O3, and
NF3)

IT 7664-39-3, **Hydrogen fluoride**, uses
7789-23-3, Potassium fluoride

(electrolyzer having binary electrolyte flux contg. **HF**
and KF)

IT 7664-41-7, Ammonia, uses

(electrolyzer having ternary electrolyte flux contg. **HF**
and KF and NH3)

L31 ANSWER 17 OF 42 HCA COPYRIGHT 2004 ACS on STN

128:7479 RI-MP2. First derivatives and global consistency. Weigend,
Florian; Haser, Marco (Institut Physikalische Chemie, Universitat
Karlsruhe, Karlsruhe, D-76128, Germany). Theoretical Chemistry
Accounts, 97(1-4), 331-340 (English) 1997. CODEN: TCACFW.
ISSN: 1432-881X. Publisher: Springer.

AB The evaluation of RI-MP2 first derivs. with respect to nuclear
coordinates or with respect to an external elec. field is described.
The prefix RI indicates the use of an approx. resohn. of identity in
the Hilbert space of interacting charge distributions (Coulomb
metric), i.e., the use of an auxiliary basis set to approx. charge
distributions. The RI technique is applied to first derivs. of the
MP2 correlation energy expression while the (restricted)
Hartree-Fock ref. is treated in the usual way. Computational
savings by a factor of 10 over conventional approaches are
demonstrated in an application to porphyrin. The RI approxn. to MP2
derivs. does not entail any significant loss in accuracy. Finally,
the relative energetic stabilities of a representative sample of
closed-shell mols. built from first and second row elements were
investigated by the RI-MP2 approach, and thus it is tested whether

such properties that refer to potential energy hypersurfaces in a more global way can be described with similar consistency to the more locally defined derivs.

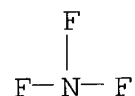
IT 7664-39-3, Hydrofluoric acid, properties 7782-41-4
 , Fluorine, properties 7783-54-2, Nitrogen
 trifluoride
 (total energy and formation energy calcn. by MP2 first
 derivs. in the RI approxn.)
 RN 7664-39-3 HCA
 CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 65-1 (General Physical Chemistry)
 Section cross-reference(s): 22, 67, 69, 76
 IT 50-00-0, Formaldehyde, properties 56-23-5, Tetrachloromethane,
 properties 64-18-6, Formic acid, properties 67-56-1, Methanol,
 properties 71-43-2, Benzene, properties 74-82-8, Methane,
 properties 74-84-0, Ethane, properties 74-85-1, Ethene,
 properties 74-86-2, Ethyne, properties 74-90-8, Hydrocyanic
 acid, properties 75-15-0, Carbon disulfide, properties 75-73-0,
 Tetrafluoromethane 101-60-0, Porphyrin 110-02-1, Thiophene
 124-38-9, Carbon dioxide, properties 157-16-4, 2H-Azirine
 157-39-1, Tetrahydrofuran 302-01-2, Hydrazine, properties 460-12-8,
 Butadiyne 463-79-6, Carbonic acid, properties 506-63-8,
 Beryllium dimethyl 630-08-0, Carbon monoxide, properties
 1333-74-0, Hydrogen, properties 2053-29-4, Methylimide
 2551-62-4, Sulfur hexafluoride 3618-05-1, Diazene 6569-51-3,
 Borazole 6829-52-3 6914-07-4, Isohydrocyanic acid 7440-41-7,
 Beryllium, properties 7447-41-8, Lithium chloride, properties
 7580-67-8, Lithium hydride 7637-07-2, Boron trifluoride,
 properties 7647-01-0, Hydrochloric acid, properties 7647-19-0,
 Phosphorus pentafluoride 7664-38-2, Phosphoric acid, properties

7664-39-3, Hydrofluoric acid, properties 7664-41-7,
 Ammonia, properties 7664-93-9, Sulfuric acid, properties
 7697-37-2, Nitric acid, properties 7722-84-1, Hydrogen peroxide
 (H₂O₂), properties 7727-37-9, Nitrogen, properties 7732-18-5,
 Water, properties 7782-41-4, Fluorine, properties
 7782-50-5, Chlorine, properties 7782-77-6, Nitrous acid
 7783-06-4, Hydrogen sulfide, properties 7783-41-7, Oxygen
 difluoride 7783-54-2, Nitrogen
 trifluoride 7783-55-3, Phosphorus trifluoride 7783-60-0,
 Sulfur tetrafluoride 7787-52-2, Beryllium hydride 7789-24-4,
 Lithium fluoride, properties 7790-89-8, Chlorine monofluoride
 7790-91-2, Chlorine trifluoride 7803-51-2, Phosphine 12057-24-8,
 Lithium oxide, properties 12057-29-3, Lithium phosphide (Li₃P)
 12125-01-8, Ammonium fluoride ((NH₄)F) 12136-58-2, Lithium sulfide
 12185-09-0, Phosphorus, mol (P₂), properties 12185-10-3,
 Phosphorus, mol (P₄), properties 12597-10-3, Sulfur, mol (S₅),
 properties 13205-44-2 13283-31-3, Borane, properties
 13445-50-6, Phosphorus hydride (P₂H₄) 13465-07-1, Hydrogen sulfide
 (H₂S₂) 13598-22-6, Beryllium sulfide 13774-81-7 13814-25-0,
 Sulfur difluoride 14332-28-6, Nitroxyl 14452-59-6, Lithium, mol
 (Li₂), properties 16949-15-8, Lithium tetrahydroborate
 19287-45-7, Diborane 20500-69-0 20670-26-2 23550-45-0, Sulfur,
 mol (S₂), properties 26134-62-3, Lithium nitride 27174-99-8,
 Tetraborane(4) 29860-66-0, Beryllium hydride (Be₂H₄) 41916-72-7,
 Phosphorus hydride (P₂H₂) 42851-09-2, Tetrazete 54686-48-5,
 Beryllium fluoride (Be₂F₄) 57363-78-7, Lithium, mol (Li₈),
 properties 58500-89-3, Beryllium, mol (Be₄), properties
 78715-99-8 183199-97-5

(total energy and formation energy calcn. by MP2 first
 derivs. in the RI approxn.)

L31 ANSWER 18 OF 42 HCA COPYRIGHT 2004 ACS on STN

127:25046 Nitrogen trifluoride process. Tarancon,
 Gregorio (Florida Scientific Laboratories, Inc., USA). U.S. US
 5628894 A 19970513, 19 pp. (English). CODEN: USXXAM.

APPLICATION: US 1995-544073 19951017.

AB A method for the prodn. of nitrogen
 trifluoride (NF₃) and hydrogen (H₂) gas, starting
 with a molten flux including at least ammonia (NH₃), a metal
 fluoride, and hydrogen fluoride (HF),
 including the steps of: circulating the molten flux from an
 electrolyzer, to an ammonia solubilizer, to a nitrogen
 trifluoride reactor, to a hydrogen
 fluoride solubilizer, and back to the electrolyzer;
 maintaining the quantity of the molten flux substantially const. by
 adding ammonia (NH₃) and a carrier gas to the ammonia solubilizer
 and by adding hydrogen fluoride (HF)
 and a carrier gas to the hydrogen fluoride

solubilizer; producing **fluorine (F2) gas** and hydrogen (H2) gas in the electrolyzer; transferring the carrier gas from at least one of the solubilizers to the **nitrogen trifluoride** reactor; mixing the **fluorine gas** and the carrier gas and supplying the mixed gases to the **nitrogen trifluoride** reactor; reacting the **fluorine gas** with the molten flux in the **nitrogen trifluoride** reactor to produce **nitrogen trifluoride (NF3)**; and collecting the **nitrogen trifluoride (NF3)** produced at a **nitrogen trifluoride** condenser and collecting the hydrogen (H2) produced at a hydrogen condenser.

IT 7782-41-4, Fluorine, reactions
(fluorination of NH3 with **F2** in **prodn.** of
nitrogen trifluoride)

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

IT 7664-39-3, Hydrogen fluoride, uses
(fluorination of NH3 with **F2** in **prodn.** of
nitrogen trifluoride in molten flux contg. NH3
and metal fluoride and **HF**)

RN 7664-39-3 HCA

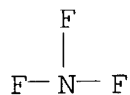
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2P, Nitrogen trifluoride
(process for **manufg.** **NF3** using electrolyzer)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C25B001-24

ICS C25B015-08; C01B021-16

NCL 205359000

CC 72-9 (Electrochemistry)

Section cross-reference(s): 49

ST **nitrogen trifluoride** process

- IT Fluorination
(fluorination of NH3 with **F2** in **prodn.** of
nitrogen trifluoride in molten flux contg. NH3
and metal fluoride and **HF**)
- IT Fluorides, uses
(fluorination of NH3 with **F2** in **prodn.** of
nitrogen trifluoride in molten flux contg. NH3
and metal fluoride and **HF**)
- IT 7440-01-9, Neon, uses 7440-59-7, Helium, uses
(as carrier gas in **nitrogen trifluoride**
process)
- IT 1333-74-0P, Hydrogen, **preparation**
(electrolyzer for **producing NF3** and H2)
- IT 7782-41-4, Fluorine, reactions
(fluorination of NH3 with **F2** in **prodn.** of
nitrogen trifluoride)
- IT 7664-39-3, Hydrogen fluoride, uses
(fluorination of NH3 with **F2** in **prodn.** of
nitrogen trifluoride in molten flux contg. NH3
and metal fluoride and **HF**)
- IT 7664-41-7, Ammonia, reactions
(fluorination of NH3 with **F2** in **prodn.** of
nitrogen trifluoride in molten flux contg. NH3
and metal fluoride and **HF**)
- IT 7789-23-3, Potassium fluoride
(fluorination of NH3 with **F2** in **prodn.** of
nitrogen trifluoride in molten flux contg. NH3
and potassium fluoride and **HF**)
- IT 7783-54-2P, **Nitrogen trifluoride**
(process for **manufg. NF3** using electrolyzer)
- L31 ANSWER 19 OF 42 HCA COPYRIGHT 2004 ACS on STN
124:274115 Manufacture of optical fibers from fluoride glass. Nishida,
Yoshitake; Ooishi, Yasutake; Kanamori, Teruhisa; Terunuma, Yukio;
Fujiura, Kazuo; Sudo, Shoichi (Nippon Telegraph & Telephone, Japan).
Jpn. Kokai Tokkyo Koho JP 08012363 A2 **19960116** Heisei,
14 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1995-5184
19950117. PRIORITY: JP 1994-86628 19940425.
- AB In the title manuf., which entails (A) forming a composite of a
jacket tube retaining a glass rod having higher refractive index
(partially) than that of the jacket, (B) heating and rolling the
composite to give a mother material, and (C) heating and
wire-drawing to form the optical fiber, in step B the internal
pressure of the composite is maintained at a neg. value (relative to
the external pressure) and He, H, and/or D is introduced into the
composite. The fiber may be a fluoride glass. The gas used in step
B may contain an inactive **gas** or a **F-contg.**
gas. Alternately, the title manuf. may entail steps A and

B, as above, followed by (B') inserting the mother material into a 2nd jacket tube to give a 2nd composite, and step C as above, in which He, H, and/or D may be introduced into the composite in step B and/or C. A liq. may be introduced into the composites at the steps in which He, H, and/or D are introduced in the above methods. The liq. may be a macromol., a solder with low m.p., In, or Hg. In the manuf. comprising steps A, B, B', and C, one step of B or C may be performed by the liq. induction, and the other step of them is performed by the gas induction. The optical fiber shows high mech. strength and low loss.

IT 7664-39-3, Hydrogen fluoride, processes
 7782-41-4, Fluorine, processes
 7783-54-2, Trifluoroamine
 (manuf. of optical fibers from fluoride glass)
 RN 7664-39-3 HCA
 CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C03B037-012
 ICA G02B006-00
 CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
 Section cross-reference(s): 57
 IT 75-73-0, Tetrafluoromethane 76-16-4, Hexafluoroethane 2551-62-4,
 Hexafluorosulfur 7664-39-3, Hydrogen
 fluoride, processes 7782-41-4, Fluorine,
 processes 7783-54-2, Trifluoroamine 13709-36-9,
 Xenon difluoride
 (manuf. of optical fibers from fluoride glass)

L31 ANSWER 20 OF 42 HCA COPYRIGHT 2004 ACS on STN
 124:189013 Preparation of high-purity anhydrous indium fluoride raw

material for optical fibers. Nishida, Yoshitake; Ooishi, Yasutake; Terunuma, Yukio; Sudo, Shoichi (Nippon Telegraph & Telephone, Japan). Jpn. Kokai Tokkyo Koho JP 07330335 A2 19951219 Heisei, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-130570 19940613.

AB The title method involves the following steps: heating an In compd. or metal In with a fluorinating agent to produce anhyd. fluoride; and heating the anhyd. indium fluoride to remove impurities by vaporization to obtain oxide impurity-free InF₃.

IT 7664-39-3, Hydrogen fluoride, processes

7782-41-4, Fluorine, processes

7783-54-2, Nitrogen trifluoride

(prepn. of high-purity indium fluoride raw material for optical fibers)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)

F

F—N—F

IC ICM C01G015-00

ICS C03B037-012; G02B006-00

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 49

IT 75-73-0, Carbon tetrafluoride 1312-43-2, Indium oxide (In₂O₃)

2551-62-4, Sulfur hexafluoride 7440-74-6, Indium, processes

7664-39-3, Hydrogen fluoride, processes

7782-41-4, Fluorine, processes

7783-54-2, Nitrogen trifluoride

12125-01-8, Ammonium fluoride

(prepn. of high-purity indium fluoride raw material for optical fibers)

L31 ANSWER 21 OF 42 HCA COPYRIGHT 2004 ACS on STN

117:241582 Binary systems in electrochemical fluorination. I. Sulfamoyl fluoride and hydrazinium(2+) fluoride. Sartori, P.; Lattasch, K. D. (Fachgeb. Anorg. Chem., Univ.-Gesamthochsh.-Duisburg, Duisburg, 4100/1, Germany). Journal of Fluorine Chemistry, 57(1-3), 113-19 (English) 1992. CODEN: JFLCAR. ISSN: 0022-1139.

AB The effect on the **formation** of **NF3** of H2NSO2F added during the molten-salt electrolysis of ammonium **hydrogen fluoride** was studied with varying amts. of **hydrogen fluoride**. Depending on the conditions of the reaction, the molten fluoride system not only served as solvent and fluorine source for the electrochem. fluorination (ECF) of H2NSO2F, but also as electrolyte. The main **products** were SO2F2, **NF3**, N2 and traces of N2F2. Results from similar expts. with N2H6F2 are described.

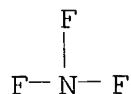
IT 7664-39-3, **Hydrogen fluoride**, uses
(electrolysis of fluoride melt contg., with hydrazinium fluoride)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4
(fluorination, electrochem., in binary systems contg. hydrazinium fluoride and sulfamoyl fluoride)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IT 7783-54-2P, **Nitrogen trifluoride**
(**formation** of, in electrolysis of hydrazinium fluoride and sulfamoyl fluoride)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)
Section cross-reference(s): 68, 78
ST fluorination electrochem fluoride molten salt; sulfamoyl fluoride electrolysis nickel electrode; hydrazinium fluoride electrolysis

nitrogen fluoride prodn

- IT 7664-39-3, **Hydrogen fluoride**, uses
(electrolysis of fluoride melt contg., with hydrazinium fluoride)
- IT 14986-54-0, Sulfamoyl fluoride
(electrolysis of, in fluoride medium, **nitrogen fluoride** and sulfur oxide fluoride prodn. in)
- IT 13537-45-6
(electrolysis of, in fluoride medium, **nitrogen fluoride prodn.** in)
- IT 7782-41-4
(fluorination, electrochem., in binary systems contg. hydrazinium fluoride and sulfamoyl fluoride)
- IT 1333-74-0P, Hydrogen, preparation 7727-37-9P, Nitrogen,
preparation 7783-54-2P, **Nitrogen trifluoride**
(**formation** of, in electrolysis of hydrazinium fluoride and sulfamoyl fluoride)

L31 ANSWER 22 OF 42 HCA COPYRIGHT 2004 ACS on STN

117:200452 Anodic reaction on nickel in a molten cesium

fluoride-ammonium fluoride-**hydrogen fluoride** system. Tasaka, Akimasa; Mizuno, Kazuyoh; Kamata, Akira; Miki, Keiji; Sato, Kazunobu; Teruta, Hirohito; Yanagawa, Katsuya (Dep. Appl. Chem., Doshisha Univ., Kyoto, 602, Japan). Proceedings - Electrochemical Society, 16(Proc. Int. Symp. Molten Salts, 8th, 1992), 564-73 (English) 1992. CODEN: PESODO. ISSN: 0161-6374.

AB The anodic reaction on Ni was studied at 50-80.degree. using a molten CsF-NH₄F-**HF** system. The addn. of CsF into the molten electrolyte reduces the corrosion of the Ni anode. The anodic reaction on Ni varied with increasing potential, permitting division into 4 regions as follows: anodic dissoln. of Ni in region I (0-1 V vs. H₂), deposition of a Ni(II) compd. contg. oxide on Ni in region II (1-3 V), oxidn. of Ni(II) film to Ni(III) and/or Ni(IV) compds. in region III (3-5 V), and electrochem. fluorination of NH₃ in region IV (more pos. than 5 V). The anode gas was composed of **NF₃** and N₂ with a small amt. of O₂, N₂O, difluorodiazene (N₂F₂), and tetrafluorohydrazine (N₂F₄).

IT 7664-39-3, **Hydrogen fluoride**, uses
(anodic reaction of nickel in molten system contg.)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4
(fluorination, electrochem., of ammonia, nickel anodic reaction

in fluoride melt in relation to)

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IT 7783-54-2P, Nitrogen trifluoride

(formation of, in anode gas, anodic reaction of nickel
in fluoride melt in relation to)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)

F

|
F-N-F

CC 72-2 (Electrochemistry)

Section cross-reference(s): 56

ST nickel anodic reaction fluoride melt; cesium ammonium

hydrogen fluoride melt nickel; oxidn electrochem

nickel molten fluoride; polarization anodic nickel fluorine melt

IT 7664-39-3, Hydrogen fluoride, uses

(anodic reaction of nickel in molten system contg.)

IT 7440-02-0, Nickel, reactions

(anodic reaction of, in molten cesium fluoride-ammonium fluoride-
hydrogen fluoride system)

IT 7782-41-4

(fluorination, electrochem., of ammonia, nickel anodic reaction
in fluoride melt in relation to)

IT 7727-37-9P, Nitrogen, preparation 7782-44-7P, Oxygen, preparation

7783-54-2P, Nitrogen trifluoride

10024-97-2P, Nitrous oxide, preparation 10036-47-2P,

Tetrafluorohydrazine 10578-16-2P, Nitrogen

fluoride (N2F2)

(formation of, in anode gas, anodic reaction of nickel
in fluoride melt in relation to)

L31 ANSWER 23 OF 42 HCA COPYRIGHT 2004 ACS on STN

117:159540 Electrochemical perfluorination using multicomponent
electrolytes. Sartori, P.; Juenger, C.; Lattasch, K. D.

(Univ.-GH-Duisburg, Germany). DECHEMA Monographien,
125(Elektrochem. Stoffgewinnung: Grundlagen Verfahrenstech.),
233-42 (German) 1992. CODEN: DMDGAG. ISSN: 0070-315X.

AB The application of an electrochem. perfluorination process (ECF) for
the prodn. of perfluoro compds. contg. functional groups may be
limited due to low soly. of educts, poor cond. of the resulting

electrolyte and/or the formation of dangerous byproducts. The authors try to overcome such obstacles by modifying this method. The use of electrolytes consisting of several compds. not only yields >1 fluorinated product but results in a smoother reaction as well. Examples are the electrolysis of NH_4F in **HF** with the addn. of hydrazinium difluoride or sulfamoyl fluoride and the simultaneous prepn. of perfluoro-alkane-sulfonyl fluoride and **NF₃** in the ECF of aliph. sulfonamides.

IT 7664-39-3, Hydrofluoric acid, uses
(ammonium fluoride electrolysis in, with addn. of hydrazinium difluoride or sulfamoyl fluoride)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4
(fluorination, per-, electrochem., for prodn. of perfluoro compds. contg. functional groups by using multicomponent electrolytes)

RN 7782-41-4 HCA

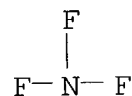
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

IT 7783-54-2P, Nitrogen trifluoride
(**prepn.** of, simultaneously with perfluoroalkanesulfonyl fluoride, by electrochem. perfluorination of aliph. sulfonamides)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF_3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 72-4 (Electrochemistry)
Section cross-reference(s): 49

IT Sulfonamides
(aliph., electrochem. perfluorination of, simultaneous prepn. of perfluoroalkanesulfonyl fluoride and **nitrogen trifluoride** from)

IT Sulfonyl fluorides
(alkane, perfluoro, **prepn.** of, simultaneously with **nitrogen trifluoride** by electrochem. perfluorination of aliph. sulfonamides)

- IT 7664-39-3, Hydrofluoric acid, uses
(ammonium fluoride electrolysis in, with addn. of hydrazinium
difluoride or sulfamoyl fluoride)
- IT 7782-41-4
(fluorination, per-, electrochem., for prodn. of perfluoro
comps. contg. functional groups by using multicomponent
electrolytes)
- IT 7783-54-2P, Nitrogen trifluoride
(prepn. of, simultaneously with perfluoroalkanesulfonyl
fluoride, by electrochem. perfluorination of aliph. sulfonamides)

L31 ANSWER 24 OF 42 HCA COPYRIGHT 2004 ACS on STN
116:115646 A method of forming a corrosion-resistant protective coating
on aluminum substrate. Lorimer, D'Arcy H.; Bercaw, Craig A.
(Applied Materials, Inc., USA). Eur. Pat. Appl. EP 460701 A1
19911211, 9 pp. DESIGNATED STATES: R: DE, FR, GB, NL.
(English). CODEN: EPXXDW. APPLICATION: EP 1991-109363 19910607.
PRIORITY: US 1990-534807 19900607; US 1990-534796 19900607.

AB The protective coating is formed by contacting an Al oxide layer on
an Al substrate with .gtoreq.1 F-contg. **gases** at
an elevated temp. The Al oxide coating is formed by anodization.

- IT 7664-39-3P, Hydrogen fluoride,
preparation 7782-41-4P, Fluorine, preparation
7783-54-2P, Nitrogen trifluoride
(formation of corrosion-resistant protective coatings
by, on aluminum oxide-coated aluminum surfaces)

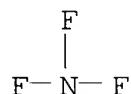
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)

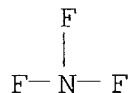


IC ICM C25D011-18
ICS C23C008-10

- CC 72-7 (Electrochemistry)
Section cross-reference(s): 56
- IT Anodization
(of aluminum surfaces, with subsequent **treatment** with
fluorine-contg. **gases** for forming
corrosion-resistant protective coatings)
- IT Corrosion prevention
(on aluminum oxide-coated substrates, with **fluorine**
-contg. **gases**)
- IT 7429-90-5, Aluminum, miscellaneous
(corrosion-resistant protective coatings on aluminum oxide layers
on, with **fluorine**-contg. **gases**)
- IT 7664-39-3P, Hydrogen fluoride,
preparation 7782-41-4P, Fluorine, preparation
7783-54-2P, Nitrogen trifluoride
75-46-7, Trifluoromethane 75-73-0, Tetrafluoromethane 76-16-4,
Hexafluoroethane
(**formation** of corrosion-resistant protective coatings
by, on aluminum oxide-coated aluminum surfaces)
- IT 1344-28-1, Aluminum oxide, properties
(on aluminum surfaces, with **fluorine**-contg.
gases, forming corrosion-resistant protective coatings
on)
- L31 ANSWER 25 OF 42 HCA COPYRIGHT 2004 ACS on STN
116:115645 Corrosion-resistant protective coating on aluminum substrate
or surface and method of forming it. Lorimer, D'Arcy H.; Bercaw,
Craig A. (Applied Materials, Inc., USA). Eur. Pat. Appl. EP 460700
A1 19911211, 9 pp. DESIGNATED STATES: R: DE, FR, GB, NL.
(English). CODEN: EPXXDW. APPLICATION: EP 1991-109362 19910607.
PRIORITY: US 1990-534796 19900607; US 1990-534807 19900607.
- AB The protective coating is formed by contacting an Al oxide layer on
an Al surface with .gtoreq.1 **F**-contg. **gases** at
an elevated temp. The Al surface is used in a reactor for
processing semiconductor wafers.
- IT 7664-39-3P, Hydrogen fluoride,
preparation 7782-41-4P, Fluorine, preparation
7783-54-2P, Nitrogen trifluoride
(**formation** of corrosion-resistant protective coatings
by, on aluminum oxide coated aluminum surfaces)
- RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)
- HF
- RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



- IC ICM C25D011-18
ICS C23C008-10
- CC 72-7 (Electrochemistry)
Section cross-reference(s): 56, 76
- IT Anodization
(of aluminum surfaces, with subsequent **treatment** with **fluorine**-contg. **gases** for forming corrosion-resistant protective coatings)
- IT Corrosion prevention
(on aluminum oxide coated aluminum substrates, with **fluorine**-contg. **gases**)
- IT 7429-90-5, Aluminum, miscellaneous
(corrosion-resistant protective coatings on aluminum oxide layers on, with **fluorine**-contg. **gases**)
- IT 7664-39-3P, **Hydrogen fluoride**,
preparation 7782-41-4P, **Fluorine**, preparation
7783-54-2P, **Nitrogen trifluoride**
75-46-7, **Trifluoromethane** 75-73-0, **Tetrafluoromethane** 76-16-4,
Hexafluoroethane
(**formation** of corrosion-resistant protective coatings by, on aluminum oxide coated aluminum surfaces)
- IT 1344-28-1, **Aluminum oxide**, properties
(on aluminum surfaces, with **fluorine**-contg. **gases**, forming corrosion-resistant protective coatings)
- L31 ANSWER 26 OF 42 HCA COPYRIGHT 2004 ACS on STN
116:27130 Removal of **nitrogen trifluoride** from gases
containing fluorides and nitrogen oxides. Yasuhara, Yoshiharu
(Ebara Sogo Kenkyusho K. K., Japan; Ebara-Infilco Co., Ltd.; Ebara Corp.). Jpn. Kokai Tokkyo Koho JP 03202128 A2 19910903
Heisei, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
1989-338271 19891228.
- AB **NF3** is removed from gases contg. **NF3**, fluorides
(**HF**, **SiF4**, **F2**, etc.), and/or N oxides by
treatment with adsorbents and allowing residual **NF3** to
react with metal-treating agents at .gtoreq.250.degree., where the

fluorides of the metals have a m.p. higher than the reacting temps. **NF3** is effectively removed without interference of fluorides or nitrogen oxides. Thus, a gas contg. **NF3** 2, **F2** 4, **NO2** 4, **NO** 2, and **N2** 88 vol.% was treated with Ca(OH)_2 and activated C followed by fibrous Fe at .apprx.350.degree.. Contents of **NF3**, N oxides, fluorides in the gas were reduced to 10, .ltoreq.1, .ltoreq.3 ppm, resp.

IT 7664-39-3, Hydrofluoric acid, miscellaneous
7782-41-4, **Fluorine**, miscellaneous
(gases contg., **nitrogen fluoride**
removal from, by adsorption and metal fluoridation)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IT 7783-54-2, **Nitrogen trifluoride**
(removal of, from gases contg. fluorides and/or nitrogen oxides,
by adsorption and metal fluoridation)
RN 7783-54-2 HCA
CN Nitrogen fluoride (**NF3**) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM B01D053-34
ICS B01D053-34
CC 59-4 (Air Pollution and Industrial Hygiene)
ST **nitrogen trifluoride** removal gas fluoride;
fluoride nitrogen removal gas; metal fluoridation **nitrogen**
trifluoride removal; adsorption **nitrogen**
trifluoride gas
IT Molecular sieves
Silica gel, uses
(adsorbent, for **nitrogen fluoride**, for
removal from gases contg. fluorides and/or nitrogen oxides)
IT Adsorbents
(for **nitrogen fluoride**, for removal from
gases contg. fluorides and/or nitrogen oxides)

- IT Fluorides, **preparation**
(**formation of, in nitrogen fluoride**
removal from gases)
- IT Metallic fibers
(iron, reaction with, of **nitrogen fluoride** in
gases contg. fluorides and/or nitrogen oxides, for removal)
- IT 7440-44-0, Carbon, uses
(activated, adsorption with, of **nitrogen fluoride**, in removal from gases contg. fluorides and/or
nitrogen oxides)
- IT 12612-41-8, Hopcalite 1305-78-8, Calcium oxide, uses 1309-42-8,
Magnesium hydroxide 1309-48-4, Magnesium oxide, uses 1313-13-9,
Manganese oxide (MnO₂), uses 1317-38-0, Copper oxide (CuO), uses
1344-28-1, Alumina, uses
(adsorbent, for **nitrogen fluoride**, for
removal from gases contg. fluorides and/or nitrogen oxides)
- IT 1305-62-0, Calcium hydroxide, uses
(adsorption with, of **nitrogen fluoride**, in
removal from gases contg. fluorides and/or nitrogen oxides)
- IT 7783-61-1, Silicon fluoride (SiF₄) 10102-43-9, Nitrogen oxide
(NO), miscellaneous 10102-44-0, Nitrogen dioxide, miscellaneous
11104-93-1, Nitrogen oxide, miscellaneous
(gases contg., **nitrogen fluoride** removal
from, by adsorption and metal fluoridation)
- IT 7664-39-3, Hydrofluoric acid, miscellaneous
7782-41-4, **Fluorine**, miscellaneous
(**gases contg., nitrogen fluoride**
removal from, by adsorption and metal fluoridation)
- IT 7439-89-6, Iron, reactions
(reaction with, of **nitrogen fluoride**, for
removal from gases contg. fluorides and/or nitrogen oxides)
- IT 7783-54-2, **Nitrogen trifluoride**
(removal of, from gases contg. fluorides and/or nitrogen oxides,
by adsorption and metal fluoridation)

L31 ANSWER 27 OF 42 HCA COPYRIGHT 2004 ACS on STN

115:169018 Fused salt electrolysis using nickel anode for fluorine
compound preparation. Tasaka, Akimasa; Tateno, Toshio (Morita
Kagaku Kogyo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 03104891
A2 19910501 Heisei, 5 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1989-244332 19890919.

- AB F₂ or a F compd. are prepd. by electrolyzing in a fused
salt contg. CsF and HF or a raw material using an anode of
a Ni-contg. metal or an insol. element, a diaphragm, and a metal
cathode. NF₃, obtained from electrolysis of a NH₄F-CsF-
HF fused salt using a Ni anode, had low CF₄ impurity.
- IT 7664-39-3, Hydrofluoric acid, uses and miscellaneous
(fused salt contg., electrolysis of, for fluorine compd. prepn.)

RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

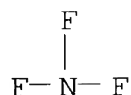
HF

IT 7782-41-4P, Fluorine, preparation 7783-54-2P,
Nitrogen trifluoride
(prepn. of, by fused salt electrolysis, using nickel
anode)

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C25B001-24
CC 72-5 (Electrochemistry)
ST electrolysis fused salt fluorine prep; nickel anode electrolysis
fused salt; **nitrogen fluoride** electrolysis
prepn
IT 7664-39-3, Hydrofluoric acid, uses and miscellaneous
12125-01-8, Ammonium fluoride 13400-13-0, Cesium fluoride
(fused salt contg., electrolysis of, for fluorine compd. prep.)
IT 7782-41-4P, Fluorine, preparation 7783-54-2P,
Nitrogen trifluoride
(prepn. of, by fused salt electrolysis, using nickel
anode)

L31 ANSWER 28 OF 42 HCA COPYRIGHT 2004 ACS on STN
115:139177 **Nitrogen trifluoride**-based gas mixtures
for cleaning. Arai, Hiromichi (Central Glass Co., Ltd., Japan).
Jpn. Kokai Tokkyo Koho JP 03146681 A2 19910621 Heisei, 4
pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1989-283541
19891031.

AB The mixts. comprise **NF3** contg. 0.05-20 vol.% F, Cl and/or
HF(g). The gas mixts. are used for cleaning sediments on
walls and jigs in film-forming processes, e.g., chem.-vapor
deposition, sputtering, etc.

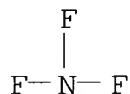
IT 7783-54-2, **Nitrogen fluoride** (

NF3)

(gas mixts. contg., for cleaning residues in film-forming processes)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7664-39-3, Hydrofluoric acid, uses and miscellaneous

7782-41-4, Fluorine, uses and miscellaneous

(nitrogen trifluoride-based gas mixts.

contg., for cleaning residues in film-forming processes)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IC ICM C23F004-00

ICS C01B007-00; C09K013-08; C23C016-44; C23G005-00

CC 49-8 (Industrial Inorganic Chemicals)

Section cross-reference(s): 76

ST **nitrogen trifluoride** cleaning gas compn;fluorine **nitrogen trifluoride** cleaning gas;chlorine **nitrogen trifluoride** cleaning gas;**hydrogen fluoride nitrogen****trifluoride gas**

IT Cleaning

(app., of walls in film-forming, **nitrogen****trifluoride**-based gas mixts. for)

IT Coating process

(chem.-vapor, app., residue removal from walls in,

nitrogen trifluoride-based gas mixts. forro)

IT 7783-54-2, Nitrogen fluoride (

NF3)

(gas mixts. contg., for cleaning residues in film-forming processes)

IT 7664-39-3, Hydrofluoric acid, uses and miscellaneous

7782-41-4, Fluorine, uses and miscellaneous 7782-50-5,

Chlorine, uses and miscellaneous

(nitrogen trifluoride-based gas mixts.

contg., for cleaning residues in film-forming processes)

L31 ANSWER 29 OF 42 HCA COPYRIGHT 2004 ACS on STN

114:113476 Electron cyclotron resonance (ECR) plasma etching process and ECR plasma etching apparatus. Mihara, Satoru; Motoyama, Takushi (Fujitsu Ltd., Japan). Eur. Pat. Appl. EP 407169 A2 19910109, 9 pp. DESIGNATED STATES: R: DE, FR, GB. (English). CODEN: EPXXDW. APPLICATION: EP 1990-307306 19900704. PRIORITY: JP 1989-172524 19890704.

AB An electron cyclotron resonance (ECR) plasma etching process using an ECR etching app. having a plasma generation chamber, and gas supply entrances provided in each chamber, comprises the steps of: directing microwaves into the plasma generation chamber, applying a magnetic field to the plasma generation chamber, and supplying a 1st gas which is used for generating a deposit of a protective film to the reaction chamber. Materials are specified. The side wall parallel to the plasma flow is constantly cleaned.

IT 7664-39-3, Hydrogen fluoride, uses and miscellaneous

(in generation of protective film in electron cyclotron resonance plasma etching)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4, Fluorine, uses and miscellaneous

7783-54-2, Nitrogen trifluoride

(plasma generation by, in electron cyclotron resonance etching)

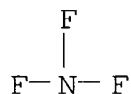
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01J037-32

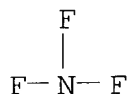
ICS H01L021-311; H01L021-321; H01L021-306
CC 76-11 (Electric Phenomena)
IT 7446-09-5, Sulfur dioxide, uses and miscellaneous 7550-45-0,
Titanium tetrachloride, uses and miscellaneous 7647-01-0, Hydrogen
chloride, uses and miscellaneous **7664-39-3**,
Hydrogen fluoride, uses and miscellaneous
7783-61-1, Silicon tetrafluoride 7789-66-4, Silicon tetrabromide
10025-67-9, Disulfur dichloride 10026-04-7, Silicon tetrachloride
10294-34-5, Boron trichloride 10545-99-0, Sulfur chloride (SCl₂)
(in generation of protective film in electron cyclotron resonance
plasma etching)
IT 124-38-9, Carbon dioxide, uses and miscellaneous 630-08-0, Carbon
monoxide, uses and miscellaneous 2551-62-4, Sulfur hexafluoride
7439-90-9, Krypton, uses and miscellaneous 7440-37-1, Argon, uses
and miscellaneous 7440-59-7, Helium, uses and miscellaneous
7440-63-3, Xenon, uses and miscellaneous 7726-95-6, Bromine, uses
and miscellaneous 7727-37-9, Nitrogen, uses and miscellaneous
7782-41-4, Fluorine, uses and miscellaneous 7782-44-7,
Oxygen, uses and miscellaneous 7782-50-5, Chlorine, uses and
miscellaneous **7783-54-2**, **Nitrogen**
trifluoride 10035-10-6, Hydrogen bromide, uses and
miscellaneous 10102-43-9, Nitrogen monoxide, uses and
miscellaneous 10102-44-0, Nitrogen dioxide, uses and miscellaneous
(plasma **generation** by, in electron cyclotron resonance
etching)
L31 ANSWER 30 OF 42 HCA COPYRIGHT 2004 ACS on STN
112:225396 Current balance of the electrochemical fluorination of a
trialkylamine. Dimitrov, A.; Stewig, H.; Ruediger, S.; Kolditz, L.
(Cent. Inst. Inorg. Chem., Acad. Sci. GDR, Berlin, 1199, Ger. Dem.
Rep.). Journal of Fluorine Chemistry, 47(1), 13-22 (English)
1990. CODEN: JFLCAR. ISSN: 0022-1139.
AB The electrochem. fluorination of dibutylmethylamine was studied.
All the fluorination products formed, liq., gaseous, and dissolved
in **HF**, and also the hydrogen evolved were quant. detd.
From either their formulae or their relative fluorine contents the
amt. of current necessary for their formation was estd. Altogether,
the fluorination products detd. cover .apprx.86-92% of the current
applied. A major part of the current was consumed by prodn. of
polyfluorinated compds., which remained dissolved in the
hydrogen fluoride.
IT **7664-39-3**, Hydrofluoric acid, uses and miscellaneous
(electrochem. fluorination of dibutylmethylamine in)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4
(fluorination, electrochem., of dibutylmethylanine in
hydrofluoric acid)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

IT 7783-54-2P, Nitrogen fluoride (NF3)
(formation of, in electrochem. fluorination of
dibutylmethylanine in hydrofluoric acid)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)
Section cross-reference(s): 22, 23
IT 7664-39-3, Hydrofluoric acid, uses and miscellaneous
(electrochem. fluorination of dibutylmethylanine in)
IT 7782-41-4
(fluorination, electrochem., of dibutylmethylanine in
hydrofluoric acid)
IT 75-10-5P, Difluoromethane 75-46-7P, Trifluoromethane 75-73-0P,
Tetrafluoromethane 76-16-4P, Hexafluoroethane 76-19-7P,
Octafluoropropane 115-25-3P, Octafluorocyclobutane 355-25-9P,
Decafluorobutane 514-03-4P, Perfluorodibutylmethylanine
7783-54-2P, Nitrogen fluoride (NF3)
(formation of, in electrochem. fluorination of
dibutylmethylanine in hydrofluoric acid)

L31 ANSWER 31 OF 42 HCA COPYRIGHT 2004 ACS on STN
112:127726 Electrochemical reaction of ammonium pentafluoronibate on
carbon in molten fluoride. Tasaka, Akimasa; Mimoto, Atsuhisa;
Kanetani, Kihei; Kimura, Munehiro; Ohshima, Kinya; Watanabe, Morio
(Dep. Appl. Chem., Doshisha Univ., Kyoto, 602, Japan). Science and
Engineering Review of Doshisha University, 30(3), 171-80 (Japanese)
1989. CODEN: DDRKAZ. ISSN: 0036-8172.

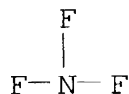
AB KF-HF bath for F2 prodn. or KF-HF-NH4F
bath for NF3 prodn. added with (NH4)3NbOF6 (I)
(that is converted to (NH4)2NbOF5 in these baths) was electrolyzed

at 120.degree. using amorphous C anode, for the purpose of 1-step synthesis of NbF₅. The c.d. in cyclic voltammetry at the potential just before the anodic passivation potential depended on concn. of I, and the soly. of I in these baths was estd. as 1.0 mol %. I showed catalytic action for decompn. of (CF)_n on the anode, and neither the low-valence species produced at the cathode reduced (CF)_n. No prodn. of NbF₅ was found in evolved gas, and the main reaction was probably the cathodic redn. and anodic oxidn. of Nb species paralleling with fluorination of ammonium and pentafluoronibate ions.

IT 7664-39-3, **Hydrogen fluoride**, uses and miscellaneous
 (electrochem. reaction of ammonium pentafluoronibate on carbon in melt of potassium fluoride and)
 RN 7664-39-3 HCA
 CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2P, **Nitrogen trifluoride**
 (formation of, in electrochem. reaction of ammonium pentafluoronibate on carbon in molten fluoride)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7782-41-4P, **Fluorine**, preparation
 (prodn. of, from melt of potassium fluoride and **hydrogen fluoride**, electrochem. reaction of ammonium pentafluoronibate on carbon in relation to)
 RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

CC 72-5 (Electrochemistry)
 IT Electric current
 (efficiency of, for hydrogen evolution in potassium fluoride-**hydrogen fluoride**-ammonium fluoride-ammonium pentafluoronibate system)
 IT Electrolytic polarization
 (anodic, in ammonium pentafluoronibate-potassium fluoride-

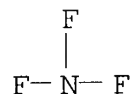
- hydrogen fluoride system)
- IT 7447-40-7, Potassium chloride, uses and miscellaneous
(electrochem. reaction of ammonium pentafluoroniobate on carbon
in melt of **hydrogen fluoride** and)
- IT 7664-39-3, **Hydrogen fluoride**, uses and
miscellaneous
(electrochem. reaction of ammonium pentafluoroniobate on carbon
in melt of potassium fluoride and)
- IT 12125-02-9, Ammonium chloride, uses and miscellaneous
(electrochem. reaction of ammonium pentafluoroniobate on carbon
in melt of potassium fluoride and **hydrogen
fluoride** and)
- IT 75-73-0P, Carbon tetrafluoride 7727-37-9P, Nitrogen, preparation
7782-44-7P, Oxygen, preparation **7783-54-2P,
Nitrogen trifluoride** 10024-97-2P, Dinitrogen
oxide, preparation
(formation of, in electrochem. reaction of ammonium
pentafluoroniobate on carbon in molten fluoride)
- IT 1333-74-0P, Hydrogen, preparation
(formation of, in potassium fluoride-**hydrogen
fluoride**-ammonium fluoride-ammonium pentafluoroniobate
system, effect of molar fraction of ammonium pentafluoroniobate
on current efficiency for)
- IT **7782-41-4P**, Fluorine, preparation
(prodn. of, from melt of potassium fluoride and **hydrogen
fluoride**, electrochem. reaction of ammonium
pentafluoroniobate on carbon in relation to)
- L31 ANSWER 32 OF 42 HCA COPYRIGHT 2004 ACS on STN
108:105293 On the existence of pentacoordinated nitrogen. Christe, Karl
O.; Wilson, William W.; Schrobilgen, Gary J.; Chirakal, Raman V.;
Olah, George A. (Rocketdyne, Canoga Park, CA, 91303, USA).
Inorganic Chemistry, 27(5), 789-90 (English) **1988**. CODEN:
INOC AJ. ISSN: 0020-1669.
- AB The thermal decompn. of NF₄HF₂ was studied by using ¹⁸F-labeled
HF₂⁻. The obsd. distribution of ¹⁸F among the decompn. products
indicates that within exptl. error the attack of HF₂⁻ on NF₄⁺ occurs
exclusively on F and not on N, contrary to the predictions based on
bond polarities. These results confirm the previous suggestion that
the lack of pentacoordinated N species is mainly due to steric
reasons.
- IT 7664-39-3P, **Hydrogen fluoride**,
preparation **7782-41-4P**, Fluorine, preparation
7783-54-2P, **Nitrogen trifluoride**
(formation of, in thermal decompn. of
tetrafluoroammonium bifluoride)
- RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 78-9 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 67
IT 7664-39-3P, Hydrogen fluoride,
preparation 7782-41-4P, Fluorine, preparation
7783-54-2P, Nitrogen trifluoride
(formation of, in thermal decompn. of
tetrafluoroammonium bifluoride)

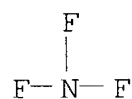
L31 ANSWER 33 OF 42 HCA COPYRIGHT 2004 ACS on STN
107:25551 Purification of gases for helium-group halide excimer lasers.
Hakuta, Kohzo; Aramaki, Minoru; Suenaga, Takashi (Central Glass Co.,
Ltd., Japan). Ger. Offen. DE 3632995 A1 19870402, 10 pp.
(German). CODEN: GWXXBX. APPLICATION: DE 1986-3632995 19860929.
PRIORITY: JP 1985-213691 19850928; JP 1986-122206 19860529.
AB Laser gases which comprise a He-group gas, a gas derived from a
halogen, and impurities, and which are used as He-group halide
excimer lasers, are purified by contacting them with .gtoreq.1
solid, alk. compds., i.e. alkali metal and/or alk. earth compds., to
convert active and acid substances to solid metal compds., and then
contacting the remaining gas with zeolites to adsorb the residual
impurities. Addnl., the halogen-derived gas is a highly oxidizing
gas, and the laser gas is contacted with .gtoreq.1 reactive metal to
at least convert the highly oxidizing gas to a metal halide prior to
the above step of contacting with the alk. compds. A KrF laser gas
initially comprising Kr 5, F 0.3, and He 94.7%, after operation for
3 h, contained .apprx.0.2 vol.% F, and the presence of SiF4,
HF, CF4, H2O, O, and N as impurities was confirmed. Purifn.
as described above restored the performance level of the gas to 80%
of its initial value.
IT 7782-41-4, Fluorine, uses and miscellaneous

(excimer laser gases contg., purifn. and regeneration of)

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

IT 7783-54-2P, **Nitrogen trifluoride**
(lasers, excimer, gas purifn. and regeneration for)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7664-39-3, Hydrofluoric acid, uses and miscellaneous
(removal of, from helium-group halide gases for excimer lasers)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IC ICM B01D053-00
ICS H01S003-134
ICA B01D053-14; B01D053-02; B01J020-04; B01J020-16; H01S003-045;
H01S003-223
CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 73
IT 7439-90-9, Krypton, uses and miscellaneous 7440-59-7, Helium, uses
and miscellaneous 7440-63-3, Xenon, uses and miscellaneous
7782-41-4, Fluorine, uses and miscellaneous 7782-50-5,
Chlorine, uses and miscellaneous
(excimer laser gases contg., purifn. and regeneration of)
IT 7783-54-2P, **Nitrogen trifluoride**
7790-89-8P, Chlorine monofluoride 7790-91-2P, Chlorine trifluoride
13780-38-6P, Xenon chloride 59680-94-3P, Krypton fluoride
(lasers, excimer, gas purifn. and regeneration for)
IT 75-73-0, Carbon tetrafluoride 124-38-9, Carbon dioxide, uses and
miscellaneous 7664-39-3, Hydrofluoric acid, uses and
miscellaneous 7727-37-9, Nitrogen, uses and miscellaneous
7782-44-7, Oxygen, uses and miscellaneous 7783-61-1, Silicon
tetrafluoride
(removal of, from helium-group halide gases for excimer lasers)

- 106:167299 Oxide film on a silicon substrate. Morita, Mizuho; Hirose, Zenko (Japan). Jpn. Kokai Tokkyo Koho JP 61223177 A2
19861003 Showa, 4 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1985-64860 19850328.
- AB A method for forming an oxide film having a desired compn. at a low temp. and increased rate involves the following steps: (1) contacting a mixt. of O and F sources to a Si substrate at 0-1300.degree. to prep. a F-contg. or fluorinated oxide film; and (2) contacting the oxide film to H2O or steam source at 0-1300.degree.. Optionally, the F source may be comprised of **NF3**, F, **HF**, or XeF2, and the O source may be comprised of O, N2O, or NO2.
- IT **7664-39-3, Hydrogen fluoride**, uses and miscellaneous **7782-41-4, Fluorine**, uses and miscellaneous **7783-54-2, Nitrogen trifluoride**
(in **prepn.** of oxide films on silicon substrates)
- RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)
- HF
- RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)
- F— F
- RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)
- F
|
F—N—F
- IC ICM C23C008-10
CC 76-3 (Electric Phenomena)
IT **7664-39-3, Hydrogen fluoride**, uses and miscellaneous **7782-41-4, Fluorine**, uses and miscellaneous **7782-44-7, Oxygen**, uses and miscellaneous **7783-54-2, Nitrogen trifluoride** 10024-97-2, Nitrous oxide, uses and miscellaneous 10102-44-0, Nitrogen dioxide, uses and miscellaneous 13709-36-9, Xenon difluoride
(in **prepn.** of oxide films on silicon substrates)
- L31 ANSWER 35 OF 42 HCA COPYRIGHT 2004 ACS on STN
99:132751 Reactions between ammonium fluoride, hydrazinium(1+) or

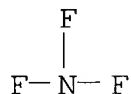
hydrazinium(2+) fluoride and some noble gas fluorides. Druzina, B.; Slivnik, J.; Zemva, B. (J. Stefan Inst., Edvard Kardelj Univ., Ljubljana, Yugoslavia). Vestnik Slovenskega Kemijskega Drustva, 30(3), 267-76 (English) 1983. CODEN: VSKDAA. ISSN: 0560-3110.

AB Reactions between NH_4F , $\text{N}_2\text{H}_5\text{F}$, $\text{N}_2\text{H}_6\text{F}_2$ and an excess of XeF_2 , XeF_6 or KrF_2 always gave N, HF and Xe. In some cases **NF₃** was also obtained. Fluorination of hydrazinium fluorides by XeF_2 in the presence of metals (M = Fe, Cr) proceeded via the corresponding NH_4MF_4 as an intermediate compd. This was not the case with XeF_6 , which is strong enough to fluorinate any transiently formed NH_4MF_4 . KrF_2 decompd. before it was able to fluorinate all the reaction products completely and therefore NH_4MF_4 was also formed in the reaction vessel.

IT 7783-54-2P
(formation of, in reactions of ammonium fluoride or hydrazinium fluorides and noble gas fluorides with or without iron or chromium)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF_3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7664-39-3P, preparation
(formation of, in reactions of ammonium fluoride or hydrazinium fluorides with noble gas fluorides with or without iron chromium)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4P, preparation
(formation of, in reactions of ammonium fluoride or hydrazinium fluorides with noble gas fluorides with or without iron or chromium)

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

CC 78-9 (Inorganic Chemicals and Reactions)

IT 7783-54-2P

(formation of, in reactions of ammonium fluoride or

hydrazinium fluorides and noble gas fluorides with or without iron or chromium)

- IT 7664-39-3P, preparation
(formation of, in reactions of ammonium fluoride or hydrazinium fluorides with noble gas fluorides with or without iron chromium)
- IT 7727-37-9P, preparation 7782-41-4P, preparation
(formation of, in reactions of ammonium fluoride or hydrazinium fluorides with noble gas fluorides with or without iron or chromium)

L31 ANSWER 36 OF 42 HCA COPYRIGHT 2004 ACS on STN

97:205622 Nitrogen trifluoride-fluorine

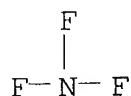
gas generator compositions. Christe, Karl O.; Wilson, William W. (United States Dept. of the Army, USA). U. S. Pat. Appl. US 361638 A0 19820827, 7 pp. Avail. NTIS Order No. PAT-APPL-6-361 638. (English). CODEN: XAXXAV. APPLICATION: US 1982-361638 19820325.

- AB Compns. are described for solid propellant NF3-F2 gas generators, useful in HF-DF chem. lasers, using (NF4)2TiF6 and clinkering agents derived from LiF, KF, and NaF, either alone or in mixts. (NF4)2TiF6 forms thermally stable clinkers with the lighter alk. metal fluorides NaF and LiF and less than stoichiometric amts. of these alk. metal fluorides are required for the formation of a stable clinker due to the ability of TiF4 to form polytitanate anions.

- IT 7783-54-2
(gas generator of fluorine mixt. with, for chem. lasers)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



- IT 7782-41-4, uses and miscellaneous
(gas generator of nitrogen trifluoride mixt. with, for chem. lasers)

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

- IT 7664-39-3, uses and miscellaneous
(lasers from deuterium fluoride and, fluorine-nitrogen trifluoride gas

generator compns. for)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

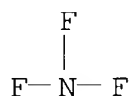
HF

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST **nitrogen fluoride** fluorine **generator**
laser; hydrogen deuterium fluoride laser; titanate fluoro gas
generator laser
IT Lasers
(chem., deuterium fluoride-hydrogen fluoride,
fluorine-nitrogen trifluoride
gas generator compns. for)
IT 7681-49-4, uses and miscellaneous
(clinkering agents using, for **fluorine-nitrogen**
trifluoride gas generator compns. for
chem. lasers)
IT 7789-23-3 7789-24-4, uses and miscellaneous 61128-92-5
(clinkering agents using, for **fluorine-nitrogen**
trifluoride gas generator compns. for
chem. lasers)
IT 7783-54-2
(**gas generator** of fluorine mixt.
with, for chem. lasers)
IT 7782-41-4, uses and miscellaneous
(**gas generator** of **nitrogen**
trifluoride mixt. with, for chem. lasers)
IT 7664-39-3, uses and miscellaneous
(lasers from deuterium fluoride and, **fluorine-**
nitrogen trifluoride gas
generator compns. for)
IT 14333-26-7
(lasers from **hydrogen fluoride** and,
fluorine-nitrogen trifluoride
gas generator compns. for)

L31 ANSWER 37 OF 42 HCA COPYRIGHT 2004 ACS on STN
91:202072 Self-clinkering burning rate modifier for solid propellant
nitrogen trifluoride-fluorine
gas generators for chemical lasers. Christe, Karl
O.; Schack, Carl J. (United States Dept. of the Navy, USA). U.S. US
4163773 19790807, 2 pp. (English). CODEN: USXXAM.
APPLICATION: US 1978-970775 19781218.
AB N2F3SnF5, a self-clinkering N2F3+ salt useful as a burning rate
modifier for solid propellant **NF3-F2** gas

generators for chem. **HF-DF** lasers, was prepd. by the reaction of $\text{N}_2\text{F}_3\text{SbF}_6$ with Cs_2SnF_6 in the presence of **HF**. $\text{N}_2\text{F}_3\text{SbF}_6$ was prepd. from SbF_5 and N_2F_4 and was reacted with Cs_2SnF_6 to yield $\text{N}_2\text{F}_3\text{SnF}_5$ which was characterized by ^{19}F NMR and vibrational spectroscopy.

IT 7783-54-2
 (gas **generating** compns. from fluorine and, for chem. lasers, self-clinkering burning rate modifier for)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF_3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7782-41-4, uses and miscellaneous
 (gas **generator** compns. from **nitrogen trifluoride** and, for chem. lasers, self-clinkering burning rate modifier for)
 RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

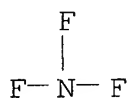


IT 7664-39-3, uses and miscellaneous
 (lasers, self-clinkering burning rate modifier for gas generators for)
 RN 7664-39-3 HCA
 CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)



IC C01B021-18
 NCL 423351000
 CC 73-6 (Spectra by Absorption, Emission, Reflection, or Magnetic Resonance, and Other Optical Properties)
 Section cross-reference(s): 78
 ST **nitrogen fluoride** fluoroantimonate modifier
 laser; burning rate modifier laser; antimonate fluoro modifier
 laser; fluoride hydrogen deuterium laser
 IT Lasers
 (deuterium fluoride-**hydrogen fluoride**, gas generators for, self-clinkering burning rate modifier for)
 IT 7783-54-2
 (gas **generating** compns. from fluorine and, for chem.

- lasers, self-clinkering burning rate modifier for)
- IT 7782-41-4, uses and miscellaneous
(gas **generator** compns. from **nitrogen**
trifluoride and, for chem. lasers, self-clinkering
burning rate modifier for)
- IT 7664-39-3, uses and miscellaneous 14333-26-7
(lasers, self-clinkering burning rate modifier for gas generators
for)
- IT 16919-25-8
(reaction of, with **nitrogen fluoride**
hexafluoroantimonate)
- L31 ANSWER 38 OF 42 HCA COPYRIGHT 2004 ACS on STN
90:79053 Fluorine generator for chemical lasers. Warren, W. R.; et al.
(United States Dept. of the Air Force, USA). U. S. Pat. Appl. US
888813 19781013, 13 pp. Avail. NTIS. (English). CODEN:
XAXXAV. APPLICATION: US 1978-888813 19780321.
- AB The storage, handling, and toxicity problems assocd. with the use of
F2 as a reactant for chem. lasers were eliminated by the use
of a storable gas supply of **NF3** as a means for generating
mol. and/or at. F for use with **HF** or **DF** continuous-wave or
pulsed chain chem. lasers. The high efficiency of pulsed **HF**
laser operation at 1 atm pressure was demonstrated. The **NF3**
is thermally dissocd. and then cooled to the temp. required for use
in the laser immediately prior to injection into the laser plenum.
- IT 7783-54-2
(fluorine **generator**, for chem. lasers)
- RN 7783-54-2 HCA
- CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



- IT 7782-41-4, uses and miscellaneous
(**generator**, for chem. lasers, **nitrogen**
trifluoride as)
- RN 7782-41-4 HCA
- CN Fluorine (8CI, 9CI) (CA INDEX NAME)
- F-F
- IT 7664-39-3, uses and miscellaneous
(lasers, **nitrogen trifluoride** as fluorine
generator for chem.)
- RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

CC 73-6 (Spectra by Absorption, Emission, Reflection, or Magnetic Resonance, and Other Optical Properties)

ST **nitrogen fluoride fluorine generator**
laser; **hydrogen fluoride** laser fluorine
generator

IT Lasers
(chem., **nitrogen trifluoride** as fluorine
generator for)

IT 7783-54-2
(fluorine **generator**, for chem. lasers)

IT 7782-41-4, uses and miscellaneous
(**generator**, for chem. lasers, **nitrogen**
trifluoride as)

IT 7664-39-3, uses and miscellaneous
(lasers, **nitrogen trifluoride** as fluorine
generator for chem.)

L31 ANSWER 39 OF 42 HCA COPYRIGHT 2004 ACS on STN

88:151825 Ground states of molecules. 40. MNDO results for molecules containing fluorine. Dewar, Michael J. S.; Rzepa, Henry S. (Dep. Chem., Univ. Texas, Austin, TX, USA). Journal of the American Chemical Society, 100(1), 58-67 (English) 1978. CODEN: JACSAT. ISSN: 0002-7863.

AB Heats of formation, mol. geometries, 1st ionization potentials and dipole moments were calcd. by the MNDO (modified neglect of diat. orbitals) method for F-contg. compds. Major improvement, in comparison with MNDO/3, is obtained for most properties. The relative energies of conformational and geometrical isomers agree with expts., and in some cases the results are superior to those obtained by ab initio methods. The calcd. properties of the polyfluoromethane radical cations agree with the obsd. stabilities. Agreement is also obtained for higher vertical ionization energies, and particularly for species such as F2, where the highest occupied MO are correctly predicted as .pi.g, .pi.u, and .SIGMA.g+ sym., esp. Calcd. proton and electron affinities agree with exptl. values. Singlet-triplet sepsns. for fluorocarbons and :NF are discussed.

IT 7664-39-3, properties 7782-41-4, properties
7783-54-2
(heat of **formation** of, MO calcn. of)

RN 7664-39-3 HCA

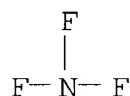
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 22-8 (Physical Organic Chemistry)
 Section cross-reference(s): 65

IT 75-02-5 75-10-5 75-37-6 75-38-7 75-46-7 75-73-0 75-89-8
 76-05-1, properties 76-16-4 115-25-3 116-14-3, properties
 334-99-6 353-36-6 353-50-4 353-85-5 358-95-2 359-11-5
 363-72-4 367-11-3 371-62-0 372-18-9 372-38-3 373-64-8
 373-91-1 392-56-3 420-26-8 420-46-2 421-50-1 430-64-8
 456-22-4 462-06-6 540-36-3 557-99-3 593-53-3 624-72-6
 675-14-9 684-16-2 693-85-6 697-11-0 700-16-3 753-58-2
 814-73-3 931-91-9 1493-02-3 1495-50-7 1630-77-9 1630-78-0
 2264-21-3 2670-13-5 2713-09-9 3248-58-6 3744-07-8
 3744-29-4 7127-18-6 7637-07-2, properties **7664-39-3**,
 properties **7782-41-4**, properties 7783-41-7
7783-54-2 7789-25-5 7789-26-6 10022-50-1 10036-47-2
 10405-27-3 12061-70-0 12355-90-7 13453-52-6 13703-95-2
 13709-83-6 13774-92-0D, fluorinated derivs. 13776-62-0
 13779-24-3 13812-43-6 13842-55-2 13847-65-9 13867-66-8
 13965-73-6 13967-06-1 14034-79-8 14984-90-8 15499-23-7
 18238-55-6 18851-76-8 23361-56-0 23728-64-5 26202-31-3
 29526-61-2 29526-62-3 31685-31-1 35310-31-7 35398-31-3
 37366-64-6 38607-35-1 39819-67-5 40640-67-3 50673-31-9
 54128-17-5 57449-71-5 57449-72-6 59012-17-8 59012-18-9
 59122-96-2 64881-36-3 66177-07-9 66177-08-0
 (heat of **formation** of, MO calcn. of)

L31 ANSWER 40 OF 42 HCA COPYRIGHT 2004 ACS on STN
 87:209265 Solid gas generators for chemical lasers. Bowen, R. E.;
 Pisacane, F. J.; Barber, W. H.; Dengel, O. H.; Robb, R. A. (White
 Oak Lab., Nav. Surf. Weapons Cent., Silver Spring, MD, USA). U. S.
 NTIS, AD Rep., AD-A042674, 16 pp. Avail. NTIS From: Gov. Rep.
 Announce. Index (U. S.) 1977, 77(21), 227 (English) 1976.

CODEN: XADRCH.

AB Solid gas generator formulations which produce H₂, D₂, and a mixt. of F₂ and NF₃ were developed for HF/DF chem.lasers. NF₄BF₄ was chosen as the oxidizer candidate for the F₂/NF₃ solid gas generator. A continuous reaction for the pyrolytic prodn. of NF₄BF₄ was designed and assembled. A prodn. rate of 5 g in one h of pure NF₄BF₄ was achieved. The F₂/NF₃ solid gas generator formulation NF₄BF₄/KF/Sn was selected for further evaluation. Burning rates of the order of .08 cm/s and yields of .apprx.34 wt.% available F were realized. Pressed pellets exhibited excellent mech. and safety characteristics. A mixt. of LiAlD₄ and ND₄Cl was selected, characterized and test fired at the 1500 g level at a burning rate of 0.064 cm/s. A point design concept for a P₂/NF₃ fuel system was developed incorporating existing laser and gas generator technol.

IT 7664-39-3, uses and miscellaneous
(chem. laser, solid gas generator for)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4P, preparation 7783-54-2P
(generation of hydrogen and, for chem. lasers)

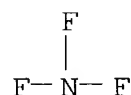
RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 73-6 (Spectra by Absorption, Emission, Reflection, or Magnetic Resonance, and Other Optical Properties)

ST hydrogen fluoride chem laser; deuterium fluoride chem laser; solid gas generator laser

IT 7664-39-3, uses and miscellaneous
(chem. laser, solid gas generator for)

IT 7782-41-4P, preparation 7783-54-2P
(generation of hydrogen and, for chem. lasers)

L31 ANSWER 41 OF 42 HCA COPYRIGHT 2004 ACS on STN

65:36195 Original Reference No. 65:6709c-e The synthesis of the perfluoroammonium cation, NF_4^+ . Tolberg, W. E.; Rewick, R. T.; Stringham, R. S.; Hill, M. E. (Stanford Res. Insts., Menlo Park, CA). Inorg. Nucl. Chem. Letters, 2(3), 79-82 (English) 1966

AB The ion was synthesized in the form of its salt, NF_4SbF_6 , and included studies of the system $\text{NF}_3/\text{F}_2/\text{SbF}_5/\text{HF}$ and its 6 binary and 4 ternary sub-systems. The synthesis occurred when equimolar quantities of NF_3 , F_2 , and SbF_5 were heated in a Monel tube reactor for .apprx.2.5 days at 200.degree. and at pressures up to 85 atm. A liquid phase of HF and SbF_5 was present at a concn. of 0.2 mole fraction of SbF_5 relative to HF at room temp. Upon completion of the reaction and analyses of unreacted starting materials, the solids exhibited a vapor pressure not in excess of a few .mu. at 200.degree.. The product was decompd. at 350.degree. in vacuo, yielding .apprx.0.01 mole of gas contg. equimolar quantities of NH_3 and F_2 . The consumption of NF_3 , F_2 , and SbF_5 was best accounted for by the formation of NF_4SbF_6 along with Ni^{++} and Cu^{++} hexafluoroantimonates. More than 40% of the NF_3 charged is converted to a solid. The crude product contains .apprx.0.035 mole of NF_4SbF_6 and is .apprx.75% pure by wt., which was characterized without further purification by means of thermal decompn., hydrolysis, and 19F N.M.R. spectra. Above 300.degree., thermal decompn. proceeded as: $\text{NF}_4\text{SbF}_6 \rightarrow \text{NF}_3 + \text{F}_2 + \text{SbF}_5$, and the hydrolysis was: $\text{NF}_4\text{SbF}_6 + 7\text{H}_2\text{O} \rightarrow \text{NF}_3 + \text{H}_2\text{O}_2 + \text{HSb}(\text{OH})_6 + 7\text{HF}$. The N.M.R. spectra of the HF soln. of the product contained a triplet resonance, centered at -214. 7ppm. from FCCl_3 . The lines were equally intense with a coupling const., JN-F of 231 cycles/sec. The chem. shift and splitting differ from any known N-F species. The salt, NF_4AsF_6 was synthesized similarly, and the product decompd. at 300.degree. to yield NF_3 , F_2 , and AsF_5 .

IT 7782-41-4, Fluorine.

(nuclear magnetic resonance of, in $\text{NF}_4[\text{SbF}_6]$)

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

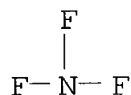
F- F

(reaction with SbF_5 , HF and NF_3 , $\text{NF}_4[\text{SbF}_6]$ formation in

IT 7783-54-2, Nitrogen fluoride,
 NF_3

(reaction with SbF_5 , fluorine and HF , $\text{NF}_4[\text{SbF}_6]$)

formation in)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7664-39-3, Hydrofluoric acid
 (reactions of, with SbF5, fluorine and **NF3**, NF4[SbF6]
 formation in)
 RN 7664-39-3 HCA
 CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

CC 14 (Inorganic Chemicals and Reactions)
 IT 7782-41-4, Fluorine.
 (nuclear magnetic resonance of, in NF4[SbF6])
 IT 7783-70-2, Antimony fluoride, SbF5
 (reaction with F, **HF** and **NF3**, NF4[SbF6]
 formation in)
 IT 7782-41-4, Fluorine.
 (reaction with SbF5, **HF** and **NF3**, NF4[SbF6]
 formation in)
 IT 7783-54-2, Nitrogen fluoride,
NF3
 (reaction with SbF5, fluorine and **HF**, NF4[SbF6]
 formation in)
 IT 7664-39-3, Hydrofluoric acid
 (reactions of, with SbF5, fluorine and **NF3**, NF4[SbF6]
 formation in)

L31 ANSWER 42 OF 42 HCA COPYRIGHT 2004 ACS on STN
 54:21104 Original Reference No. 54:4134g-i Heat of **formation**
 of **nitrogen trifluoride** and the N-F bond energy.
 Armstrong, Geo. T.; Marantz, Sidney; Coyle, Charles F. (Natl. Bur.
 of Standards, Washington, DC). Journal of the American Chemical
 Society, 81, 3798 (Unavailable) 1959. CODEN: JACSAT.
 ISSN: 0002-7863.
 AB The heats of the reaction ΔH for **NF3**(g) + 3/2H2(g) =
 1/2N2(g) + 3HF(aq., a = 1) (1) and **NF3**(g) + 4NH3(g) =
 3NH4F(c) + N2(g) (2) were detd. calorimetrically, and reasonably
 concordant values for the heat of **formation** ΔH .
Hf of **NF3** were derived. For reaction 1 the mean
 value of ΔH .degree.25 (kj./mole) was -859.0 \pm 13.4 or

-205.3 \pm 3.2 kcal./mole and ΔH_f° (NF₃) kcal./mole was -30.7 \pm 3.4. For reaction 2 the corresponding av. values were -1085.7 \pm 4.2, -259.5 \pm 1.0, and -29.4 \pm 2.1. With $E(F-F) = 37.7 \pm 1$ kcal./mole and $E(N-tpbnd.N) = 225.92 \pm 0.1$ kcal./mole, the mean N-F bond energy $E(N-F)$ in the NF₃ mol. is 66.4 \pm 0.8 kcal./mole. The dissocn. energies of the individual bonds are estd. to be at 25.degree. $D(NF_2-F) = 74.0$; $D(NF-F) = 62.6$; $D(N-F) = 62.6$ kcal./mole.

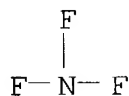
IT 7782-41-4, Fluorine
(bonds of, with N in NF₃, energy of)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IT 7664-39-3, Hydrofluoric acid
(formation of, in NF₃ reaction with H)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2, Nitrogen fluoride,
NF₃
(heat of formation of)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 2 (General and Physical Chemistry)
IT Bonds
(energy or strength of, of F with N, in NF₃)
IT Heat of dissociation
Heat of formation
(of nitrogen trifluoride)
IT Heat of reaction
(of nitrogen trifluoride with NH₃ and H)
IT 7727-37-9, Nitrogen
(bonds of, with F, energy of, in NF₃)
IT 7782-41-4, Fluorine
(bonds of, with N in NF₃, energy of)

IT 12125-01-8, Ammonium fluoride, NH_4F
(formation of, from NH_3 reaction with **NF3**)
IT 7664-39-3, Hydrofluoric acid
(formation of, in **NF3** reaction with H)
IT 7783-54-2, Nitrogen fluoride,
NF3
(heat of formation of)
IT 1333-74-0, Hydrogen
(reaction of, with **NF3**)
IT 7664-41-7, Ammonia
(reactions of, with **NF3**)

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L32 ANSWER 1 OF 26 HCA COPYRIGHT 2004 ACS on STN

138:116409 Semiconductor fabrication apparatus and its cleaning.
Nakahara, Miwako; Arai, Toshiyuki; Yamamoto, Satoshi; Ooka, Tsukasa;
Sano, Atsushi; Itaya, Shuji; Sakuma, Harunobu (Hitachi Ltd., Japan;
Hitachi Kokusai Electric Inc.). Jpn. Kokai Tokkyo Koho JP
2003027240 A2 20030129, 13 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 2001-220834 20010723.

AB In a semiconductor fabrication app. having a treatment chamber, a
movable substrate holder, and device for supplying a treatment gas,
first and second devices for supplying cleaning gases are used to
remove a film, such as Ru, Ru oxide, Os, or Os oxide, deposited on
the app. at an increased speed.

IT 7664-39-3, Hydrogen fluoride, uses
7782-41-4, Fluorine, uses
(semiconductor fabrication app. and its cleaning)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IC ICM C23C016-44

ICS H01L021-205; H01L021-285; H01L021-3065

CC 76-3 (Electric Phenomena)

Section cross-reference(s): 47, 75

IT 7647-01-0, Hydrogen chloride, uses 7664-39-3,
Hydrogen fluoride, uses 7726-95-6, Bromine, uses

7782-41-4, Fluorine, uses 7782-44-7, Oxygen, uses
7782-50-5, Chlorine, uses 10035-10-6, Hydrogen bromide, uses
57158-31-3, Chlorine fluoride 186958-04-3, **Nitrogen
fluoride**

(semiconductor **fabrication** app. and its cleaning)

L32 ANSWER 2 OF 26 HCA COPYRIGHT 2004 ACS on STN

137:22055 Method and apparatus for **manufacture** of
nitrogen trifluoride. Satchell, Donald Prentice,
Jr.; Le Roux, Johannes Petrus (The BOC Group, Inc., USA; The South
African Nuclear Energy Corporation Limited). Eur. Pat. Appl. EP
1215169 A1 20020619, 16 pp. DESIGNATED STATES: R: AT, BE, CH, DE,
DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI,
RO, MK, CY, AL, TR. (English). CODEN: EPXXDW. APPLICATION: EP
2001-650148 20011213. PRIORITY: US 2000-737191 20001214.

AB The invention provides a method and app. for the **manuf.** of
nitrogen trifluoride. The method comprises
contacting a **fluorine**-contg. feed **stream** with
liq. ammonium acid fluoride in a reaction zone for time and under
conditions sufficient to **produce nitrogen**
trifluoride. During the contacting step, the effective melt
acidity value of the liq. ammonium acid fluoride is decreased and a
reaction product stream is removed. In one embodiment, a gaseous
mixt. of elemental fluorine and **hydrogen fluoride**
is contacted with a bulk liq. ammonium acid fluoride, such that the
initial effective melt acidity value is greater than the melt
acidity value of the bulk liq. ammonium acid fluoride in the
reaction zone.

IT 7664-39-3, **Hydrogen fluoride**, reactions
(method and app. for **manuf.** of **nitrogen**
trifluoride)

RN 7664-39-3 HCA

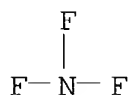
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2P, **Nitrogen trifluoride**
(method and app. for **manuf.** of **nitrogen**
trifluoride)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C01B021-083
CC 49-8 (Industrial Inorganic Chemicals)
ST **nitrogen trifluoride manuf**
IT Reactors
(method and app. for manuf. of nitrogen
trifluoride)
IT 1341-49-7, Ammonium hydrogen fluoride
7664-39-3, Hydrogen fluoride, reactions
7664-41-7, Ammonia, reactions
(method and app. for manuf. of nitrogen
trifluoride)
IT 7783-54-2P, Nitrogen trifluoride
(method and app. for manuf. of nitrogen
trifluoride)

L32 ANSWER 3 OF 26 HCA COPYRIGHT 2004 ACS on STN
136:176436 Method of producing doped polysilicon layers and polysilicon
layered structures, and method of structuring layers, and layered
structures which comprise polysilicon layers. Dreybrodt, Joerg;
Drescher, Dirk; Zedlitz, Ralf; Wege, Stephan (Germany). U.S. Pat.
Appl. Publ. US 20020016044 A1 20020207, 18 pp., Cont.-in-part of
U.S. Ser. No. 26,659, abandoned. (English). CODEN: USXXCO.
APPLICATION: US 2001-884188 20010619. PRIORITY: DE 1997-19706783
19970220; US 1998-26659 19980220.

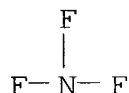
AB Doped polysilicon layers and layered polysilicon structures are
produced, and the layers and layered structures are structured. The
doping is distinguished by the fact that the doping compd. is added
as a process gas during the CVD of the polysilicon to define the
doping profile. The feed of dopant to the process gas is stopped
toward the end of the vapor deposition, with the result that a
boundary layer of undoped Si is deposited. As a result, a favorable
surface quality and better adhesion to a neighboring layer is
obtained. The structuring process comprises an .gtoreq.3-step
etching process in which a F contg. gas is used
for etching in a 1st step, a Cl-contg. gas is used for etching in a
2nd step and a Br-contg. gas is used for etching in a 3rd step. The
invention also encompasses wafers and semiconductor chips produced
with the novel doping and/or structuring method.

IT 7664-39-3, Hydrofluoric acid, processes 7783-54-2,
Nitrogen trifluoride
(etchant; method of producing doped polysilicon layers
and polysilicon layered structures, and method of structuring
layers, and layered structures which comprise polysilicon layers)

RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01L021-336
NCL 438305000
CC 76-3 (Electric Phenomena)
IT 2551-62-4, Sulfur hexafluoride 7440-59-7, Helium, processes
7647-01-0, Hydrogen chloride, processes **7664-39-3**,
Hydrofluoric acid, processes 7782-44-7, Oxygen, processes
7782-50-5, Chlorine, processes **7783-54-2, Nitrogen**
trifluoride 10035-10-6, Hydrogen bromide, processes
10294-34-5, Boron trichloride
(etchant; method of **producing** doped polysilicon layers
and polysilicon layered structures, and method of structuring
layers, and layered structures which comprise polysilicon layers)

L32 ANSWER 4 OF 26 HCA COPYRIGHT 2004 ACS on STN
134:371147 Apparatus and method for treating industrial flue
gases containing **fluorine** compounds. Mori,
Yoichi; Kyotani, Keiji; Shinohara, Toyoji (Ebara Corp., Japan).
Jpn. Kokai Tokkyo Koho JP 2001137659 A2 **20010522**, 6 pp.
(Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-328411 19991118.

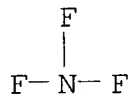
AB The title app. comprises means for passing flue **gases**
contg. **F** compds. (e.g., C2F6, C3F8, SF6 or **NF3**)
from semiconductor **manufg.** plants through a filter to sep.
flue dust, means for adding the gases with H2, H2O, and/or O2, means
for reacting the mixed gases over .gamma.-alumina catalysts at
600-900.degree. in a pyrolysis reactor to decomp. the **F** compds.,
means for adjusting the pressure of treated gases in an air ejector,
means for monitoring the gas concn. in a FT-IR analyzer, and means
for sepg. acidic pollutants (e.g., **HF**, SiCl4 or COF2) and
CO from the pyrolyzed gases in a wet scrubbing tower.

IT **7664-39-3, Hydrogen fluoride**, processes
7783-54-2, Nitrogen trifluoride
(app. and method for treating industrial flue **gases**
contg. **fluorine** compds. by pyrolysis and wet scrubbing)

RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



- IC ICM B01D053-70
ICS B01D053-34; B01D053-86; B01J021-04
- CC 59-4 (Air Pollution and Industrial Hygiene)
- ST industrial flue **gas fluorine** compd pyrolysis
scrubbing; alumina catalyst flue gas fluorohydrocarbon decompn
filter
- IT Hydrocarbons, processes
(fluoro; app. and method for treating industrial flue
gases contg. **fluorine** compds. by pyrolysis and
wet scrubbing)
- IT Flue gases
(industrial flue gases; app. and method for treating industrial
flue **gases** contg. **fluorine** compds. by
pyrolysis and wet scrubbing)
- IT 75-46-7, Trifluoromethane 76-16-4, Perfluoroethane 76-19-7,
Perfluoropropane 353-50-4, Carbonyl difluoride 630-08-0, Carbon
monoxide, processes 2551-62-4, Sulfur hexafluoride
7664-39-3, **Hydrogen fluoride**, processes
7783-54-2, **Nitrogen trifluoride**
10026-04-7, Silicon tetrachloride
(app. and method for treating industrial flue **gases**
contg. **fluorine** compds. by pyrolysis and wet scrubbing)
- IT 1344-28-1, Alumina, uses
(.gamma.-, catalysts; app. and method for treating industrial
flue **gases** contg. **fluorine** compds. by
pyrolysis and wet scrubbing)
- L32 ANSWER 5 OF 26 HCA COPYRIGHT 2004 ACS on STN
129:126455 **Treatment of fluorine** compound-containing
flue gases. Sugano, Shuichi; Arato, Toshiaki; Ikeda, Nobumitsu;
Yasuda, Takeshi; Yamashita, Toshio; Azuhata, Shigeru; Tamada, Shin
(Hitachi, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 10192653 A2
19980728 Heisei, 8 pp. (Japanese). CODEN: JKXXAF.
APPLICATION: JP 1997-4349 19970114.
- AB The title process comprises conversion of noxious F compds. contg.
.gtoreq.2 C, and optionally N in flue gases into **HF** by
reacting over decompn. catalysts contg. Al2O3, TiO2, SiO2, and/or
ZrO2 at 400-800.degree. under excess steam atm. The catalyst may
contain Si, Mg, Zr, W, Sn, Ce, Mn, Bi, and/or Ni. The catalyst may
also contain 75-98 wt.% Al2O3 and 2-25 wt.% TiO2. The process is

useful for decompn. of F compds. such as C₂F₆ and **NF₃** from semiconductor **manufg.** industry.

IT 7664-39-3, **Hydrogen fluoride**, formation
(nonpreparative)
(catalytic treatment of flue **gases** contg.
fluorine compds. from semiconductor manufg.)

RN 7664-39-3 HCA

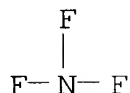
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2, **Nitrogen trifluoride**
(catalytic treatment of flue **gases** contg.
fluorine compds. from semiconductor manufg.)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM B01D053-86
ICS A62D003-00; B01J021-04; B01J021-06; B01J021-08

CC 59-6 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 67, 76

ST fluorohydrocarbon decompn flue gas catalyst; **nitrogen fluoride** decompn catalyst alumina; semiconductor flue gas fluoride decompn catalyst

IT Flue gases
Steam
(catalytic treatment of flue **gases** contg.
fluorine compds. from semiconductor manufg.)

IT Perfluoro compounds
(catalytic treatment of flue **gases** contg.
fluorine compds. from semiconductor manufg.)

IT Decomposition catalysts
(for treatment of flue **gases** contg. **fluorine** compds. from semiconductor manufg.)

IT 1314-23-4, Zirconia, uses 1344-28-1, Alumina, uses 7631-86-9,
Silica, uses 13463-67-7, Titania, uses
(catalytic treatment of flue **gases** contg.
fluorine compds. from semiconductor manufg.)

IT 7664-39-3, **Hydrogen fluoride**, formation
(nonpreparative)
(catalytic treatment of flue **gases** contg.
fluorine compds. from semiconductor manufg.)

IT 76-16-4, Hexafluoroethane 7783-54-2, Nitrogen trifluoride

(catalytic treatment of flue gases contg.

fluorine compds. from semiconductor manufg.)

IT 1303-86-2, Boron oxide, uses 1304-76-3, Bismuth oxide (Bi2O3), uses 1306-38-3, Ceria, uses 1309-48-4, Magnesia, uses 1313-13-9, Manganese dioxide, uses 1313-99-1, Nickel oxide, uses 1314-35-8, Tungsten oxide (WO3), uses 7439-95-4, Magnesium, uses 7439-96-5, Manganese, uses 7440-02-0, Nickel, uses 7440-21-3, Silicon, uses 7440-31-5, Tin, uses 7440-33-7, Tungsten, uses 7440-42-8, Boron, uses 7440-45-1, Cerium, uses 7440-67-7, Zirconium, uses 7440-69-9, Bismuth, uses 7723-14-0, Phosphorus, uses 18282-10-5, Tin oxide (SnO2)

(decompn. catalysts contg.; for treatment of flue gases contg. fluorine compds. from semiconductor manufg.)

L32 ANSWER 6 OF 26 HCA COPYRIGHT 2004 ACS on STN

127:83493 Process for nitrogen trifluoride

synthesis. Coronell, Daniel G.; Hsiung, Thomas H.L.;

Withers, Howard P., Jr.; Woytek, Andrew J. (Air Products and Chemicals, Inc., USA). U.S. US 5637285 A 19970610, 14

pp. (English). CODEN: USXXAM. APPLICATION: US 1996-593779 19960130.

AB Nitrogen trifluoride is synthesized

from elemental fluorine gas and a source of ammonia having a formula $\text{NH}_4\text{Hx}-1\text{Fx}$ where x is .gtoreq.2.55 through a gas-liq. phase reaction by input of power to the mixing means of .gtoreq.1000 W/m³ on the basis of a flat blade turbine.

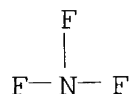
IT 7783-54-2P, Nitrogen trifluoride

(process for nitrogen trifluoride

synthesis)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7782-41-4, Fluorine, reactions

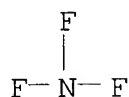
(process for nitrogen trifluoride **synthesis)**

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B021-06
NCL 423406000
CC 49-8 (Industrial Inorganic Chemicals)
ST **nitrogen trifluoride synthesis**
fluorine ammonia reaction
IT **7783-54-2P, Nitrogen trifluoride**
(process for **nitrogen trifluoride synthesis**)
IT 506-87-6, Ammonium carbonate 1341-49-7, Ammonium **hydrogen fluoride** 6484-52-2, Ammonium nitrate, reactions 7664-41-7, Ammonia, reactions **7782-41-4, Fluorine**, reactions 7783-20-2, Ammonium sulfate, reactions 12027-06-4, Ammonium iodide 12124-97-9, Ammonium bromide 12125-01-8, Ammonium fluoride 12125-02-9, Ammonium chloride, reactions (process for **nitrogen trifluoride synthesis**)
L32 ANSWER 7 OF 26 HCA COPYRIGHT 2004 ACS on STN
124:236439 Purification of **nitrogen trifluoride**.
Morikawa, Fumihiko; Hirai, Eiichi (Nissan Chemical Ind Ltd, Japan).
Jpn. Kokai Tokkyo Koho JP 07330316 A2 **19951219** Heisei, 4
pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1994-119838
19940601.
AB The purifn. process comprises preliminary removal of impurities of **F2**, **OF2**, and **HF**, and passing through activated C. The activated C may be impregnated with water. The process removes **N2F2** and **N2F4** completely.
IT **7783-54-2P, Nitrogen trifluoride**
(purifn. of **nitrogen trifluoride**)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C01B021-083
CC 49-8 (Industrial Inorganic Chemicals)
ST **nitrogen trifluoride purifn**
IT 7440-44-0, Carbon, processes
(activated; in purifn. of **nitrogen trifluoride**)
IT **7783-54-2P, Nitrogen trifluoride**
(purifn. of **nitrogen trifluoride**)

L32 ANSWER 8 OF 26 HCA COPYRIGHT 2004 ACS on STN
123:72595 Preparation of hemispherical grain (HSG) silicon using a

fluorine-based **gas** mixture and high vacuum anneal.

Thakur, Randhir P. S. (Micron Semiconductor, Inc., USA). U.S. US 5407534 A 19950418, 9 pp. (English). CODEN: USXXAM.

APPLICATION: US 1993-166058 19931210.

AB The present invention develops a process for forming hemispherical grained Si storage capacitor plates by the steps of: forming a Si layer over a pair of neighboring parallel conductive lines, the Si layer making contact to an underlying conductive region; patterning the Si layer to form individual Si capacitor plates; exposing the Si capacitor plates to a **F**-based **gas** mixt. during a high vacuum annealing period, thereby transforming the Si capacitor plates into the hemispherical grained Si capacitor plates; conductively doping the hemispherical grained Si capacitor plates; forming a capacitor dielec. layer adjacent to and coextensive with the hemispherical grained Si capacitor plates; and forming a 2nd conductive Si layer on and coextensive with the capacitor dielec. layer.

IT 7664-39-3, **Hydrogen fluoride**, processes
(etching of hemispherical grain silicon capacitor plates by)

RN 7664-39-3 HCA

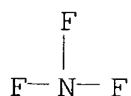
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2, **Nitrogen fluoride** (**NF3**)
(in **prepn.** of hemispherical grain silicon)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01L021-00

NCL 156662000

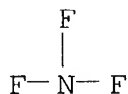
CC 76-10 (Electric Phenomena)

ST hemispherical grain silicon **prepn**; **fluorine** based
gas hemispherical silicon **prepn**; vacuum anneal hemispherical
silicon **prepn**

IT Annealing
(**prepn.** of hemispherical grain silicon using a **fluorine**
-based **gas** mixt. and high vacuum anneal)

IT 7664-39-3, **Hydrogen fluoride**, processes
10035-10-6, Hydrogen bromide, processes
(etching of hemispherical grain silicon capacitor plates by)

- IT 75-73-0, Carbon fluoride (CF4) 7440-37-1, Argon, processes
7727-37-9, Nitrogen, processes 7783-54-2, Nitrogen
fluoride (NF3)
(in **prepn.** of hemispherical grain silicon)
- IT 7440-21-3, Silicon, processes
(**prepn.** of hemispherical grain silicon using a **fluorine**
-based **gas** mixt. and high vacuum anneal)
- L32 ANSWER 9 OF 26 HCA COPYRIGHT 2004 ACS on STN
122:22285 Rare earth magnet with improved corrosion resistance and its
manufacture by fluorination. Yano, Koichi; Tokuhara, Hiroki;
Kaneko, Juji; Tasaka, Akimasa (Sumitomo Special Metals Co., Ltd.,
Japan). Jpn. Kokai Tokkyo Koho JP 06244011 A2 **19940902**
Heisei, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP
1993-343574 19931215. PRIORITY: JP 1992-358197 19921226.
- AB The magnet has a surface part contg. RF3 and/or ROxFy (R = rare
earth metals). The magnet is manufd. by fluorination of a rare
earth magnet in F or a **F**-contg. **gas** to form RF3
and/or ROxFy and optionally heat treatment at 200-1200.degree.. The
magnet showed improved corrosion resistance.
- IT **7664-39-3, Hydrogen fluoride, reactions**
7783-54-2, Nitrogen trifluoride
(fluorination agent; **manuf.** of rare earth magnet with
good corrosion resistance by surface fluorination)
- RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)
- HF
- RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



- IC ICM H01F001-053
ICS C22C033-00; C23C008-06; C23C026-00; H01F007-02
- CC 77-4 (Magnetic Phenomena)
Section cross-reference(s): 55
- IT 75-73-0 **7664-39-3, Hydrogen fluoride,**
reactions 7783-54-2, Nitrogen
trifluoride
(fluorination agent; **manuf.** of rare earth magnet with
good corrosion resistance by surface fluorination)

L32 ANSWER 10 OF 26 HCA COPYRIGHT 2004 ACS on STN

119:150311 Mass and energy analysis of gaseous species in

nitrogen trifluoride plasma during silicon reactive ion etching. Konuma, M.; Bauser, E. (Max-Planck-Inst. Festkoerperforsch., Stuttgart, 7000/80, Germany). Journal of Applied Physics, 74(1), 62-7 (English) 1993. CODEN: JAPIAU. ISSN: 0021-8979.

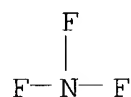
AB The main etching end products are SiF₄ mols. and SiF₃⁺ mol. ions. Reactive species that contribute to the etching are at. F radicals and F₂⁺ mol. ions. Most of the pos. ions in the plasma hold NF₂⁺ ions and this facilitates etching of neg. biased Si by bombardment. Within a certain range of plasma parameters there are no obvious differences in kinetic energies among the obsd. ions in the plasma. Under a const. NF₃ pressure of 6.7 Pa, the characteristic mean ion energy of 4 eV at an radio-frequency power of 10 W increases to 20 eV by increasing the radio-frequency power to 90 W.

IT 7783-54-2, **Nitrogen trifluoride**

(reactive ion etching of silicon by plasma from, species in)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 76-11 (Electric Phenomena)

Section cross-reference(s): 67

ST **nitrogen fluoride** plasma silicon RIE; reactive ion etching silicon **nitrogen fluoride**

IT Sputtering

(etching, reactive, of silicon with **nitrogen trifluoride**, mechanism of)

IT Kinetics of etching

(sputter, of silicon with **nitrogen trifluoride**)

IT Etching

(sputter, reactive, of silicon with **nitrogen trifluoride**, mechanism of)

IT 7783-61-1P, Silicon fluoride (SiF₄) 33687-51-3P, **Nitrogen fluoride** (N₂F)(1+) 38192-99-3P, Silicon trifluoride(1+) 62859-94-3P, Silicon tetrafluoride(1+)

(formation of, in **nitrogen trifluoride** plasma RIE of silicon)

IT 12381-92-9P, **Hydrogen fluoride**(1+)

13966-04-6P, Diatomic nitrogen(1+), preparation 14158-23-7P, Atomic nitrogen(1+), preparation 14701-13-4P, Atomic fluorine(1+),

- preparation 33146-36-0P, Nitrogen monofluoride(1+) 54384-83-7P,
Nitrogen trifluoride(1+)
(formation of, in plasma of nitrogen
trifluoride)
- IT 7732-18-5, Water, reactions
(reactions of, in nitrogen trifluoride
plasma)
- IT 7783-54-2, Nitrogen trifluoride
(reactive ion etching of silicon by plasma from, species in)
- IT 7440-21-3, Silicon, reactions
(reactive ion etching of, in nitrogen
trifluoride plasma, species in)
- L32 ANSWER 11 OF 26 HCA COPYRIGHT 2004 ACS on STN
- 111:242463 Electrochemical reaction of ammonium heptafluorotantalate on
carbon in molten fluoride. Tasaka, Akimasa; Isogai, Tomohiro;
Omatsu, Hidetoshi; Sako, Nobuyoshi; Yamaya, Satoshi; Watanabe, Morio
(Dep. Appl. Chem., Doshisha Univ., Kyoto, 602, Japan). Science and
Engineering Review of Doshisha University, 30(2), 140-51 (Japanese)
1989. CODEN: DDRKAZ. ISSN: 0036-8172.
- AB The electrochem. behavior of $(\text{NH}_4)_2\text{TaF}_7(\text{I})$ in a KF-HF melt
and in $\text{KF-HF-NH}_4\text{F}$ on a glassy C electrode in an undivided
cell was investigated. This was a fundamental study for the
development of the synthesis of metal fluorides by a 1-step
process without using F, by cyclic voltammetry,
potentiostatic measurement and electrolysis, with chromatog. gas
anal. and IR spectroscopy. The anodic current just preceding the
anodic passivation potential depended on the concn. of I. The soly.
of I in $\text{KF} \cdot 2\text{HF}$ at 120.degree. was 0.2 mol.%. The $(\text{CF})_n$ anodic film
was neither catalytically decompd. by I nor reduced by low-valence
complex ions produced at the cathode. The anodic gas contained N,
O, NF_3 , CF_4 , CO_2 , and N_2O . The anodic reaction involved
the discharge of F^- , fluorination of I and NH_4^+ , and reoxidn. of
low-valence complexes formed at the cathode.
- IT 7783-54-2P, Nitrogen trifluoride
(evolution of, in anodic gas from electrochem. reactions of
ammonium heptafluorotantalate in fluoride melt on carbon)
- RN 7783-54-2 HCA
- CN Nitrogen fluoride (NF_3) (6CI, 8CI, 9CI) (CA INDEX NAME)
- F
|
F—N—F
- CC 72-5 (Electrochemistry)
- IT 75-73-0P, Carbon tetrafluoride 124-38-9P, Carbon dioxide,
preparation 7727-37-9P, Nitrogen, preparation 7782-44-7P,

Oxygen, preparation 7783-54-2P, Nitrogen
trifluoride 10024-97-2P, Dinitrogen oxide, preparation
(evolution of, in anodic gas from electrochem. reactions of
ammonium heptafluorotantalate in fluoride melt on carbon)

L32 ANSWER 12 OF 26 HCA COPYRIGHT 2004 ACS on STN

109:159327 **Generation** and quenching of **nitrogen**

fluoride NF(a) and NF(b) molecules. Setser, D. W.; Cha, H.;
Quinones, E.; Du, K. (Dep. Chem., Kansas State Univ., Manhattan, KS,
66506, USA). Journal de Physique, Colloque (C7), C7-343/C7-346
(English) 1987. CODEN: JPQCAK. ISSN: 0449-1947.

AB The Ar(3P0,2) + NF2 and 2F + HN3 reactions were developed as sources
of NF(b1.SIGMA+) and NF(a1.DELTA.) mols., resp., in a flow reactor.
The decay kinetics for these mols. in the presence of added reagent
can be studied using std. flow reactor techniques. Room temp.
quenching rate consts. for both mols. are reported for several
reagents and compared to results for the isoelectronic O2(a) and
O2(b) mols.

IT 7664-39-3, Hydrogen fluoride, properties

7782-41-4, Fluorine, properties

(quenching reconstant of fluoroimidogen by)

RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)

ST **nitrogen fluoride prepn level**
quenching

IT 67-56-1, Methanol, properties 67-64-1, Acetone, properties
67-66-3, Chloroform, properties 74-82-8, Methane, properties
74-84-0, Ethane, properties 74-85-1, Ethylene, properties
75-50-3, Trimethylamine, properties 75-73-0, Carbon tetrafluoride
124-38-9, Carbon dioxide, properties 334-99-6 630-08-0, Carbon
monoxide, properties 666-52-4 1333-74-0, Hydrogen, properties
1455-13-6 7664-39-3, Hydrogen fluoride
, properties 7664-41-7, Ammonia, properties 7782-39-0,
Deuterium, properties 7782-41-4, Fluorine, properties
7782-44-7, Oxygen, properties 7790-89-8, Chlorine monofluoride
10024-97-2, Nitrous oxide, properties 10102-43-9, Nitric oxide,

properties

(quenching reconstant of fluoroimidogen by)

L32 ANSWER 13 OF 26 HCA COPYRIGHT 2004 ACS on STN

106:142805 Manufacture of fluoride glass. Niihori, Osamu; Mimura, Hidenori; Tokiwa, Hideharu; Nakai, Tetsuya (Kokusai Denshin Denwa Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 62017024 A2 19870126 Showa, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1985-155231 19850716.

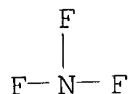
AB In the **manuf.** of fluoride glass, **NF3** and/or inert gas is fed into the reactor contg. molten fluoride glass for fluoridation. As the reaction is completed, inert gas is fed into the reactor from an inlet different from the **NF3** inlet to force the reaction product out of the reactor. By this method, removal of the highly reacted **F** gas is carried out in a safe manner, whereas dewatering or deionization treatment can be performed with a small amt. of **HF**.

IT 7783-54-2

(in **manuf.** of fluoride glass)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM C03B008-00

ICS C03C013-04

CC 57-1 (Ceramics)

ST **nitrogen trifluoride** fluoride glass
prodn; inert gas fluoride glass **prodn**

IT Fluoridation

(of fluoride glass, by **nitrogen trifluoride**)

IT 7783-54-2

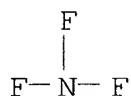
(in **manuf.** of fluoride glass)

L32 ANSWER 14 OF 26 HCA COPYRIGHT 2004 ACS on STN

105:53425 Tetrafluoroammonium salts. Christe, Karl O.; Wilson, William W.; Schack, Carl J.; Wilson, Richard D. (Rocketdyne Div., Rockwell Int. Corp., Canoga Park, CA, 91304, USA). Inorganic Syntheses, 24, 39-48 (English) 1986. CODEN: INSYA3. ISSN: 0073-8077.

AB **NF3**, **F2**, and **SbF3** react at 250.degree. and 70 atm. to give **[NF4][SbF6]**, which reacts with **Cs2[MnF6]** and **CsF** in **HF** at -78.degree. to give **[NF4]2[MnF6]** and **[NF4][HF2]**, resp. **NF3**, **F2**, and **BF3** undergo UV-photolysis at -196.degree. to give **[NF4][BF4]**. **[NF4][HF2]** reacts with **SiF4** and **WOF4** to give **[NF4]2[SiF6]** and **[NF4][WOF5]**, resp.

IT 7783-54-2
(reactions of, with fluorine and boron trifluoride or antimony trifluoride, tetrafluoroammonium salts by)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7782-41-4, reactions
(reactions of, with **nitrogen trifluoride** and boron trifluoride or antimony trifluoride, tetrafluoroammonium salts by)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)



CC 78-5 (Inorganic Chemicals and Reactions)
IT 16871-76-4P
(**prepn.** from **nitrogen trifluoride** and fluorine and antimony trifluoride and reactions of, with cesium fluoride and cesium hexafluoromanganate)
IT 15640-93-4P
(**prepn.** of, from boron trifluoride and fluorine and **nitrogen trifluoride**)
IT 79028-46-9P
(**prepn.** of, from tetrafluoroammonium hydrogen difluoride and tungsten tetrafluoride oxide in liq. **hydrogen fluoride**)
IT 7783-56-4
(reaction of, with fluorine and **nitrogen trifluoride**, tetrafluoroammonium hexafluoroantimonate by)
IT 7637-07-2, reactions
(reaction of, with **nitrogen trifluoride** and fluorine, tetrafluoroammonium tetrafluoroborate by)
IT 16962-46-2
(reaction of, with tetrafluoroammonium hexafluoroantimonate in liq. **hydrogen fluoride**, tetrafluoroammonium hexafluoromanganate by)
IT 13520-79-1
(reaction of, with tetrafluoroammonium hydrogen difluoride in liq. **hydrogen fluoride**, tetrafluoroammonium pentafluorooxotungstate by)
IT 7783-54-2

(reactions of, with fluorine and boron trifluoride or antimony trifluoride, tetrafluoroammonium salts by)

IT 7782-41-4, reactions
(reactions of, with **nitrogen trifluoride** and boron trifluoride or antimony trifluoride, tetrafluoroammonium salts by)

L32 ANSWER 15 OF 26 HCA COPYRIGHT 2004 ACS on STN
101:81575 Perfluoroammonium xenon fluoride. Christe, Karl O.; Wilson, William W. (United States Dept. of the Navy, USA). U.S. US 4447407 A 19840508, 3 pp. Division of U.S. 4,428,913. (English).
CODEN: USXXAM. APPLICATION: US 1983-540951 19831011. PRIORITY: US 1983-391786 19830624.

AB Photochem. prepn. is described of perfluoroammonium xenon fluoride compds. The compd. (NF₄)₂XeF₈ which provides the highest NF₃-F₂ yield and gives the highest theor. detonation pressures in explosive formulations is prepd. by photolysis of NF₄XeF₇ salt with blue 4880 .ANG. light of Ar ion laser.

IT 7664-39-3, properties
(in prepn. of tetrafluoroammonium fluoroxenon salt)

RN 7664-39-3 HCA

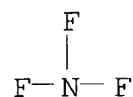
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2
(in prepn. of tetrafluoroammonium fluoroxenon salt)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



IC C01B023-00

NCL 423262000

CC 74-1 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 50

IT 7664-39-3, properties
(in prepn. of tetrafluoroammonium fluoroxenon salt)

IT 7783-54-2
(in prepn. of tetrafluoroammonium fluoroxenon salt)

IT 16871-76-4
(reaction with **hydrogen fluoride**)

L32 ANSWER 16 OF 26 HCA COPYRIGHT 2004 ACS on STN

101:32376 Coordinatively saturated fluoro cations. Oxidative fluorination reactions with fluorokrypton(1+) salts and platinum hexafluoride (PtF6). Christe, Karl O.; Wilson, William W.; Wilson, Richard D. (Rocketdyne, Rockwell Int., Canoga Park, CA, 91304, USA). Inorganic Chemistry, 23(14), 2058-63 (English) 1984. CODEN: INOCAJ. ISSN: 0020-1669.

AB The usefulness of KrF+ salts and PtF6 as oxidative fluorinators for the prepn. of the coordinatively satd. complex fluoro cations NF4+, ClF6+, and BrF6+ was studied. The prepn. of NF4SbF6, NF4AsF6, NF4BF4, and NF4TiF5.nTiF4 from KrF2-Lewis acid adducts and **NF3** were studied under different reaction conditions. The fluorination of **NF3** by KrF[SbF6] in **HF** soln. proceeded quant. at .gtoreq.-31.degree., indicating an ionic 2-electron oxidn. mechanism. An improved prepn. of KrF[MF6] (M = As, Sb), Raman data and solubilities in **HF**, and the existence of a Kr2F3+.nKrF2BF4- adduct in **HF** at -40.degree. are reported. Attempts to fluorinate OF2, CF3NF2, and ClF4O- with KrF+ salts were unsuccessful. Whereas KrF+ is capable of oxidizing **NF3**, ClF5, and BrF5 to the corresponding complex fluoro cations, PtF6 is capable of oxidizing only **NF3** and ClF5. Since the yield and purity of the NF4+ fluoroplatinate salts obtained in this manner was low, NF4PtF6 was also **prepd.** from **NF3**, **F2**, and PtF6 at elevated temp. and pressure. General aspects of the formation mechanisms of coordinatively satd. complex fluoro cations are discussed briefly.

IT 7782-41-4, reactions
(reaction of, with platinum hexafluoride and **nitrogen**
trifluoride)

RN 7782-41-4 HCA

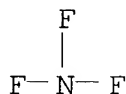
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

IT 7783-54-2
(reactions of, with krypton difluoride and arsenic pentafluoride or boron trifluoride or with platinum hexafluoride in hydrofluoric acid or fluorokrypton hexafluoroantimonate in hydrofluoric acid)

RN 7783-54-2 HCA

CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



- CC 78-9 (Inorganic Chemicals and Reactions)
- ST fluorination agent fluorokrypton platinum fluoride; **nitrogen fluoride** fluorination; halogen fluoride fluorination; krypton fluoride cation fluorination agent
- IT 52708-44-8P
(prepn. from antimony pentafluoride, **hydrogen fluoride** and krypton difluoride and reaction with **nitrogen trifluoride** in solid state or **hydrogen fluoride** soln.)
- IT 16871-75-3P
(prepn. of, from arsenic pentafluoride, krypton difluoride and **nitrogen trifluoride**)
- IT 15640-93-4P
(prepn. of, from boron trifluoride, krypton difluoride and **nitrogen trifluoride**)
- IT 58702-89-9P
(prepn. of, from fluorokrypton hexafluoroantimonate and **nitrogen trifluoride** and hydrofluoric acid)
- IT 7440-06-4DP, fluoro complexes, tetrafluoroammonium salts
30494-78-1DP, fluoroplatinate salts 90025-87-9P
(prepn. of, from **nitrogen trifluoride** and platinum hexafluoride in hydrofluoric acid)
- IT 13693-05-5
(reaction of, with chlorine pentafluoride or **nitrogen trifluoride** in hydrofluoric acid)
- IT 7783-70-2
(reaction of, with krypton difluoride and boron trifluoride, **hydrogen fluoride** or **nitrogen trifluoride**)
- IT 7637-07-2, reactions
(reaction of, with krypton difluoride and **nitrogen trifluoride**)
- IT 7784-36-3
(reaction of, with **nitrogen trifluoride** and krypton difluoride)
- IT 7782-41-4, reactions
(reaction of, with platinum hexafluoride and **nitrogen trifluoride**)
- IT 7783-54-2
(reactions of, with krypton difluoride and arsenic pentafluoride or boron trifluoride or with platinum hexafluoride in hydrofluoric acid or fluorokrypton hexafluoroantimonate in

hydrofluoric acid)

L32 ANSWER 17 OF 26 HCA COPYRIGHT 2004 ACS on STN

93:222648 **Manufacture of nitrogen**

trifluoride. (Air Products and Chemicals, Inc., USA). Jpn.

Tokkyo Koho JP 55008926 B4 **19800306** Showa, 7 pp.

(Japanese). CODEN: JAXXAD. APPLICATION: JP 1978-44116 19780414.

AB **Gaseous F** is reacted with **NH4F.HF**

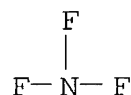
preheated to a temp. higher than its m.p. but <204.4.degree.. Thus, 60.8 kg **NH4F.HF** was charged into a reactor, heated to 126.6.degree., and reacted with 1.415 m3 **F** for 9 h. The **NF3** yield was 31%.

IT **7783-54-2P**

(manuf. of)

RN **7783-54-2** HCA

CN Nitrogen fluoride (**NF3**) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT **7782-41-4**, reactions

(reaction of, with ammonium fluoride)

RN **7782-41-4** HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)



IC C01B021-083

CC 49-8 (Industrial Inorganic Chemicals)

ST **nitrogen trifluoride manuf;** ammonium fluoride fluorination

IT **7783-54-2P**

(manuf. of)

IT **7782-41-4**, reactions

(reaction of, with ammonium fluoride)

L32 ANSWER 18 OF 26 HCA COPYRIGHT 2004 ACS on STN

89:91827 **Nitrogen trifluoride.** Woytek, Andrew

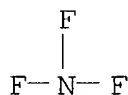
Joseph; Lileck, John Theodore (Air Products and Chemicals, Inc., USA). U.S. US 4091081 **19780523**, 6 pp. (English). CODEN:

USXXAM. APPLICATION: US 1977-788724 19770419.

AB **NF3** is **manufd.** by reacting **F** with molten **NH4HF2**

at .ltoreq.400.degree.F. **NH3** is also injected into the molten **NH4HF2** simultaneously with the **F** to maintain the molar ratio of byproduct **HF** to **NH3** at 2.0-2.5:1.

IT 7783-54-2P
(manuf. of)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7782-41-4, reactions
(reaction of, with ammonium difluoride)
RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IC C01B021-52
NCL 423406000
CC 49-8 (Industrial Inorganic Chemicals)
ST **nitrogen fluoride manuf**; ammonium
fluoride fluorination
IT 7783-54-2P
(manuf. of)
IT 7782-41-4, reactions
(reaction of, with ammonium difluoride)

L32 ANSWER 19 OF 26 HCA COPYRIGHT 2004 ACS on STN
78:86670 Perfluoroammonium cation-containing ionic salts. Tolberg,
Wesley E.; Stringham, Roger S.; Rewick, Robert T. (Stanford Research
Institute). U.S. US 3708570 **19730102**, 4 pp. (English).
CODEN: USXXAM. APPLICATION: US 1967-614524 19670130.

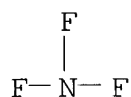
AB Solid ionic salts, e.g. NF₄SbF₆, having the highly energetic NF₄⁺,
are produced by the reaction of **NF₃**(g), F(g), and SbF₅(l)
(in the presence or absence of **HF**) at 100-200.degree. and
50-200 atm. Use of AsF₅, PF₅, or BiF₃ gives very stable, powerful
fluorinating agents and useful oxidants. For example, **NF₃**
, **F₂** and SbF₅ dissolved in liq. **HF** reacted at
.apprx.200.degree. and 1800 psi for 124 hr to yield 99.5% pure
NF₄SbF₆ and consume .apprx.60% of the **NF₃**, all the SbF₅,
and almost all of the F. All the **HF** was recovered.
Somewhat more than 60% of the **NF₃** initially present was
converted to a solid, gray-brown product. Almost all of the F and
all of the SbF₅ were consumed, whereas the **HF** was
recovered quant.

IT 7782-41-4, reactions
(in manuf., of perfluoroammonium salts)

RN 7782-41-4 HCA
CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F-F

IT 7783-54-2
(reaction of, in manuf. of perfluoroammonium salts)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



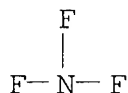
IC C01B
NCL 423301000
CC 49-5 (Industrial Inorganic Chemicals)
IT 7782-41-4, reactions
(in manuf., of perfluoroammonium salts)
IT 16871-76-4P
(manuf. of, from antimony pentafluoride and fluorine and
nitrogen fluoride)
IT 16871-75-3P
(manuf. of, from arsenic hexafluoride and fluorine and
nitrogen fluoride)
IT 7783-54-2
(reaction of, in manuf. of perfluoroammonium salts)

L32 ANSWER 20 OF 26 HCA COPYRIGHT 2004 ACS on STN
72:27708 **Nitrogen trifluoride formation** by
the potentiostatic method. Watanabe, Nobuatsu; Tasaka, Akimasa;
Nakanishi, Koichiro (Kyoto Univ., Kyoto, Japan). Denki Kagaku oyobi
Kogyo Butsuri Kagaku, 37(7), 481-5 (Japanese) 1969.
CODEN: DKOKAZ. ISSN: 0366-9297.

AB The **formation** of **NF3** by the electrolysis of
fused **KF-HF-NH4F** at 130.degree. was studied by the
potentiostatic method. The current efficiencies for anode
products (**N2**, **NF3**, **F2**, and **N2O**) depended
on the anode potential, anode c.d., and concn. of **NH4F**. When the
concn. of **NH4F** was increased, the threshold potentials for
NF3 and **F2** **production** were shifted to
the pos. side. The proposed mechanism of this system was that the
free radical of **F** was formed on the (CF)_n-I film, and **NH4+** was
fluorinated by it. The merit of this process was as follows. By
the addn. of **KF** the vapor pressure of **NH4F** and **HF** was
reduced, and the elec. cond. was increased, resulting in the

lowering of the potential with for the **generation** of **NF3**. The contamination of anode gas with **F2** was avoided by the increase of concn. of **NH4F**.

IT 7783-54-2P
 (prepn. of, by electrolysis of fused ammonium fluoride-potassium fluoride in anhydrous hydrofluoric acid)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 77 (Electrochemistry)
 ST **nitrogen trifluoride prepn**;
 trifluoride N electrochem method; electrolysis fluorides K H ammonium; fluorides K H ammonium electrolysis
 IT 7783-54-2P
 (prepn. of, by electrolysis of fused ammonium fluoride-potassium fluoride in anhydrous hydrofluoric acid)

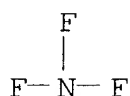
L32 ANSWER 21 OF 26 HCA COPYRIGHT 2004 ACS on STN
 70:100370 Determination of the standard enthalpy of **formation** of **nitrogen trifluoride**. Zercheninov, A. N.; Chesnokov, V. I.; Pankratov, A. V. (USSR). Zhurnal Fizicheskoi Khimii, 43(2), 390-3 (Russian) 1969. CODEN: ZFKHA9. ISSN: 0044-4537.

AB A method is described for thermal investigation of the reaction of gaseous **N fluoride** compds. with **H2** in a Pt lined calorimetric bomb. The heat of reaction **NF3(g) + 1.5H2(g)** .fwdarw. **3HF(soln.) + 0.5N2(g)** was calcd. to be $-205.38 + 0.77$ kcal./mole, side reactions caused by **N2O** and **O2** impurities and formation of **HNO3**, **NH3** and **CuF2** being considered. By use of this figure and published data on the enthalpy of **HF** in soln., standard heat of **formation** of **NF3** is calcd. as -31.57 kcal./mole. Dissocn. energies for the 3 N-F bonds in **NF3** were calcd. by using the heat of **formation** of **NF3** and published data on heat of formation of at. N and F: $E_{298}(\text{F3N}-\text{F}) = 61.1$ kcal./mole, $E_{298}(\text{FN}-\text{F}) = E_{298}(\text{F}-\text{N}) = 70.64$ kcal./mole. Heat of formation of the **NF** radical was calcd. as 61.4 ± 2.1 kcal./mole.

IT 7782-41-4, properties
 (bonds of, with nitrogen)
 RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

IT 7783-54-2
 (heat of formation of)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)

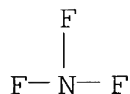


CC 69 (Thermodynamics, Thermochemistry, and Thermal Properties)
 ST **nitrogen fluorides**; enthalpy formation;
 formation enthalpy; nitrogen F bonds thermodns; fluorine N bonds
 thermodns
 IT Heat of reaction
 (of hydrogen, with **nitrogen fluoride**)
 IT Heat of **formation**
 (of **nitrogen fluoride**)
 IT 7782-41-4, properties
 (bonds of, with nitrogen)
 IT 7783-54-2 13967-06-1
 (heat of **formation** of)
 IT 1333-74-0, properties
 (heat of reaction of, with **nitrogen fluoride**)

L32 ANSWER 22 OF 26 HCA COPYRIGHT 2004 ACS on STN
 66:97012 **Production of nitrogen fluorides.**
 Fullam, Harold T.; Seklemian, Haig V. (Stauffer Chemical Co.). U.S.
 US 3304248 **19670214**, 3 pp. (English). CODEN: USXXAM.
 APPLICATION: US 19630724.

AB **NF3** and **N2F4** are **prepd.** in an easily separable
 form contacting elemental F with a N plasma. Thus, a water-cooled
 Cu reactor, 18-in. long, is fitted with a W cathode and anode. A
 plasma arc is operated at 40 v. d. c. and 300 amp. to obtain
 .apprx.8000.degree.. High-purity N2 is fed into the arc at 0.5
 standard ft.3/min. and then is passed through the hollow anode into
 the reactor chamber. **F2**, scrubbed free of **HF** by
 passage through a NaF bed, is fed to the arc chamber at the same
 rate. The resultant gas stream is at .apprx.3500.degree.; immediate
 quenching is achieved with liquid N2. By varying the ratio of N2:
F2, **NF3** can be **produced** to the exclusion
 of **N2F4**.
 IT 7783-54-2P
 (manuf. of, from fluorine and nitrogen plasma)

RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



NCL 204178000
 CC 49 (Industrial Inorganic Chemicals)
 ST **NITROGEN FLUORIDES; FLUORIDES N; FLUORINATION**
 COMPD; OXIDIZER PROPELLANTS
 IT Electric plasma
 (of nitrogen, **nitrogen fluoride** manuf
 . in)
 IT 7727-37-9, properties
 (elec. plasma, **nitrogen fluoride** (NF3
 and N2F4) manuf. in)
 IT 7783-54-2P 10036-47-2P
 (manuf. of, from fluorine and nitrogen plasma)

L32 ANSWER 23 OF 26 HCA COPYRIGHT 2004 ACS on STN

66:25306 Electrode kinetics of anodic **nitrogen**
trifluoride evolution reaction. Watanabe, Nobuatsu;
 Ishigaki, Isao; Yoshizawa, Shiro (Univ. Kyoto, Kyoto, Japan).
 Journal of the Electrochemical Society of Japan, 34(2), 77-85
 (English) 1966. CODEN: JEJOAC. ISSN: 0013-4678.

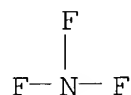
AB The anodic **production** of **NF3** was investigated on
 5 kinds of C and Pt anodes from molten KF-**HF**-NH4F baths.
 Studied were the rate of buildup of overvoltage at const. current,
 the rate of decay of overvoltage on cutting the current off, the
 c.d.-overvoltage relation, and the compn. of the gases generated.
 In the c.d. range 10⁻⁴ to 10⁻² amp./cm.², the anode gas consisted
 mainly of **NF3** with small amts. of NO and mol. F. The
 percentage of these contaminants increased at higher c.ds. The
 polarized **NF3** electrode is a mixed electrode, and
NF3 evolution seems to have activation control under certain
 conditions and diffusion control under others. The rate detg. step
 on the C electrode, when the process is activation controlled, is
 NH3.**HF** + C.F = NH2F + **HF** + H⁺ + C + e⁻, where
 C.F represents at. F adsorbed on the C electrode. The b values of
 the Tafel equations are 0.3 on Pt and 0.7 v. on C.

IT 7782-41-4P, preparation
 (at carbon or platinum anodes in fused fluoride baths)

RN 7782-41-4 HCA
 CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F—F

IT 7783-54-2P
 (formation of, on carbon or platinum anodes in fused fluoride baths)
 RN 7783-54-2 HCA
 CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 77 (Electrochemistry)
 ST KINETICS ELECTRODE N TRIFLUORIDE
 IT Overvoltage
 (on carbon or platinum anodes in fused fluoride baths, formation of nitrogen fluoride in relation to)
 IT 7782-41-4P, preparation 10102-43-9P, preparation
 (at carbon or platinum anodes in fused fluoride baths)
 IT 7783-54-2P
 (formation of, on carbon or platinum anodes in fused fluoride baths)

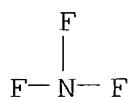
L32 ANSWER 24 OF 26 HCA COPYRIGHT 2004 ACS on STN

63:1601 Original Reference No. 63:250d-f Preparation of fluorine and its compounds. X. Electrode kinetics of the **formation of nitrogen trifluoride**. Watanabe, Nobuatsu; Ishigaki, Isao; Yoshizawa, Shiro (Univ. Kyoto, Japan). Denki Kagaku, 32(9), 674-9 (Japanese) 1964. CODEN: DNKKA2. ISSN: 0366-9440.

AB cf. ibid. 31, 698-700, 756-61(1963); CA 62, 11424f. In the electrolysis of KF + HF.NH4F at a const. current, the cathode was C (10 sq. cm.) and the anode was C, graphite, or Pt (2 sq. cm.). The gas produced at the anode was mainly **NF3** and a small amt. of NO (by ir analysis) and **F2** (by gas chromatography) at a c.d. of 10-4-10-2 amp./sq. cm. The decompn. potential E vs. H electrode, at which the anode potential vs. c.d. curve deviated from a straight line, decreased linearly with the concn. of NH4F below .fwdarw.0.1 mole % but decayed rapidly beyond this concn. Thus, E was not strictly the equil. potential of a single reaction. The Tafel equation applies to the relation between the anode c.d. and its overvoltage. After the electrolysis current had been turned off, the change of the overvoltage varied linearly with the log of the time. The slope and intercept gave b and i0

(exchange c.d.) values in agreement with those derived from the Tafel plot. The anode processes were inferred to be of the following sequence: $C + F^- \rightarrow C.F + e$, $NH_3.HF + C.F \rightarrow NH_2F + HF + H^+ + C + e$, $NH_2F + C.F \rightarrow NHF_2 + H^+ + C + e$, $NHF_2 + C.F \rightarrow NF_3 + H^+ + C + e$, $NH_2F + NHF_2 \rightarrow NF_3 + NH_3$, $NH_3 + HF \rightarrow NH_3$. HF , $C.F + F^- \rightarrow C + F_2 + e$, and $C.F + F^- \rightarrow F_2 + C + e$, where C is the carbon electrode and C.F stands for an F atom adsorbed on C.

IT 7783-54-2, Nitrogen fluoride,
NF3
(formation of, reaction kinetics at anodes in)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF3) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 15 (Electrochemistry)
IT Overvoltage
(in nitrogen fluoride (NF3)
formation)
IT Reaction kinetics and(or) Velocity
(in nitrogen fluoride (NF3)
formation at anodes)
IT Anodes and(or) Positive electrodes
(reactions, kinetics of, in NF3 formation)
IT 7783-54-2, Nitrogen fluoride,
NF3
(formation of, reaction kinetics at anodes in)

L32 ANSWER 25 OF 26 HCA COPYRIGHT 2004 ACS on STN
49:72922 Original Reference No. 49:13809c-d Fluorination of boron
nitride. Glemser, Oskar; Haeseler, Harke (Univ. Gottingen,
Germany). Z. anorg. u. allgem. Chem., 279, 141-5 (Unavailable)
1955.

AB BN reacts quantitatively with liquid HF in the presence of
a little H2O to form NH4BF4, identified by analysis and comparison
of its x-ray powder diagram with that of KBF4. F reacts
quantitatively with BN in an exothermic, chemiluminescent reaction
to form BF3 and N2. There is no evidence for the formation
of NF3. With AgF2 as the fluorinating agent, the products
are also BF3 and N2, but the reaction is not quant.
IT 7664-39-3, Hydrofluoric acid
(reaction with BN)
RN 7664-39-3 HCA

CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7782-41-4, Fluorine
(reactions with BN)

RN 7782-41-4 HCA

CN Fluorine (8CI, 9CI) (CA INDEX NAME)

F- F

CC 6 (Inorganic Chemistry)

IT Ammonium fluoborate, NH_4BF_4
(formation from HF and BN)

IT 7664-39-3, Hydrofluoric acid
(reaction with BN)

IT 7782-41-4, Fluorine
(reactions with BN)

L32 ANSWER 26 OF 26 HCA COPYRIGHT 2004 ACS on STN

23:43433 Original Reference No. 23:5014a-d High-temperature technic and new fluorides. Ruff, O. Angewandte Chemie, 42, 807-10 (Unavailable) 1929. CODEN: ANCEAD. ISSN: 0044-8249.

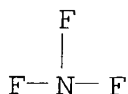
AB Vapor pressure diagrams of Fe, Co and Ni are shown, based on actual detns. in C-tube furnaces improved by the use of double, water-cooled walls. The many reactions of the refractory oxides with W and other low-volatility metals, e. g., $\text{W} + 3 \text{CaO} = \text{WO}_3 + 3 \text{Ca}$, caused renewed interest in this field. X-ray analysis was used. The main cause of cracks in pure zircon vessels above 1000.degree. was found to be reversible conversion of monoclinic ZrO_2 to the more dense, tetragonal form, which could be avoided by adding foreign oxides, such as MgO , to form a cubic lattice at 1700.degree., which is stable to sharp temp. changes. X-ray diagrams of the system $\text{ZrO}_2\text{-CaO}$ are shown. Heating chambers for 3000.degree. have been built. **NF3** was made by electrolysis of $(\text{NH}_4)\text{HF}_2$; NO_2F from NO_2 and **F2**. NO_2F b. -70.degree. instead of -63.degree. given in the literature. Liquid and gaseous **NF3** is colorless, slightly sol. in H_2O , inert to NaOH solns., and its mixts. with H_2 and NH_3 explode violently. **NF3** and H_2O vapor is not dangerous, and on ignition forms N_2O_3 , **HF** and a white ppt. of SiO_2 . Mixts. of Cl and F are explosive but can burn through a nozzle with a yellow flame; app. of Cu are used instead of glass because $4\text{ClF} + \text{SiO}_2 = 2\text{Cl}_2\text{O} + \text{SiF}_4$. The heat of formation of ClF is +22 cal.; that of **HF** by calcn. +64.8 +/- 1 cal. ClF ignites cotton instantly and burns Al more rapidly than does F. In addn. to RhF_3 there is RhF_4 or RhF_5 .

Black PdF₃ takes fire in H₂. Light brown CoF₃ gives up 1 F atom readily to most substances, e. g., warming a mixt. of CoF₃ and Si causes the mass to glow, and is therefore useful in preparative chemistry.

IT 7664-39-3, Hydrofluoric acid
(heat of formation of)
RN 7664-39-3 HCA
CN Hydrofluoric acid (8CI, 9CI) (CA INDEX NAME)

HF

IT 7783-54-2, Nitrogen fluoride,
NF₃
(prepn. of)
RN 7783-54-2 HCA
CN Nitrogen fluoride (NF₃) (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 18 (Acids, Alkalies, Salts, and Sundries)
IT Heat of formation
(of chlorine fluoride and HF)
IT 7664-39-3, Hydrofluoric acid
(heat of formation of)
IT 7783-54-2, Nitrogen fluoride,
NF₃ 10022-50-1, Nitryl fluoride 10026-18-3, Cobalt
fluoride, CoF₃ 144228-59-1, Rhodium fluoride
(prepn. of)

=> d l33 1-6 cbib abs hitstr hitind

L33 ANSWER 1 OF 6 HCA COPYRIGHT 2004 ACS on STN
96:173234 Perfluoroammonium salts of metal heptafluoride anions.
Wilson, William W.; Christe, Karl O. (Rockwell Int. Corp., Canoga
Park, CA, 91304, USA). Inorganic Chemistry, 21(5), 2091-4 (English)
1982. CODEN: INOCAJ. ISSN: 0020-1669.
AB NF₄XF₇ (X = W, U) were prepd. by allowing XF₆ to react with
NF₄HF₂.nHF. The purity of the NF₄XF₇ salts prepd. in this manner
was .apprx.98 wt.% with CsSbF₆ and NF₄SbF₆ as the principal
impurities. The NF₄XF₇ are cryst., hygroscopic solids that are
stable in a dynamic vacuum at 125.degree.. At higher temps. both
salts decomp. for form NF₃, F₂, and
XF₆.

CC 78-5 (Inorganic Chemicals and Reactions)

IT 16871-76-4

(reaction of, with cesium fluoride and **hydrogen fluoride**)

L33 ANSWER 2 OF 6 HCA COPYRIGHT 2004 ACS on STN

96:8940 Stable tetrafluoroammonium salt of high fluorine content.

Christie, Karl O.; Wilson, William W. (United States Dept. of the Army, USA). U. S. Pat. Appl. US 219056 A0 **19810731**, 10

pp. Avail. NTIS Order No. PAT-APPL-219 056 (English). CODEN:

XAXXAV. APPLICATION: US 1980-219056 19801222.

AB The prepn. and properties of $(\text{NF}_4)_2\text{MnF}_6$ are described for use as solid propellants **generating NF3-F2**

gases and explosives with high detonation pressures. $(\text{NF}_4)_2\text{MnF}_6$ has a high oxidizer content and good thermal stability. It is prepd. from NF_4SbF_6 37.29 and Cs_2MnF_6 18.53 mmol in N_2 by treating in 20 mL liq. **HF** at -78.degree., warming to 25.degree. for 30 min, and recooling.

CC 50-1 (Propellants and Explosives)

Section cross-reference(s): 49

L33 ANSWER 3 OF 6 HCA COPYRIGHT 2004 ACS on STN

94:113664 Research studies in nitrogen tetrafluoride(+)salts. Christie, K. O. (Rocketdyne Div., Rockwell Int., Canoga Park, CA, USA).

Report, ARO-14394.10-C, RI/RD80-157; Order No. AD-A086981, 124 pp.

Avail. NTIS From: Gov. Rep. Announce. Index (U. S.) 1980, 80(23), 4926 (English) **1980**.

AB The results are described of a 3-yr program in basic research studies in NF_4^+ chem. The mechanism of NF_4^+ salt formation and decompn. was detd. and the decompn. kinetics of NF_4AsF_6 and NF_4BF_4 were measured. The **formation of NF3+** salt intermediates, both in the formation and decompn. of NF_4^+ salts, was established, and the **NF3+** radical cation was thoroughly characterized by ESR spectroscopy. Improved synthetic methods were developed for NF_4SbF_6 and its metathesis to other NF_4^+ salts. A new method was developed for the synthesis of NF_4^+ salts derived from polymeric Lewis acids which do not form **HF-sol.** Cs salts.

The following new NF_4^+ salts were synthesized and thoroughly characterized: $(\text{NF}_4)_2\text{MnF}_6$, NF_4HF_2 , $\text{NF}_4\text{UF}_5\text{O}$, NF_4ClO_4 and $\text{NF}_4\text{SO}_3\text{F}$. In addn., the novel $\text{N}_2\text{F}_3\text{SnF}_5$ and $\text{N}_2\text{F}_3\text{SbF}_6$ salts, which are useful burning-rate modifiers in solid propellant **NF3-F2** gas **generator** formulations, were prepd. and characterized.

CC 78-8 (Inorganic Chemicals and Reactions)

Section cross-reference(s): 67

IT Propellants

(fluorine-nitrogen trifluoride, trifluorodiazonium salts as burning modifiers for)

L33 ANSWER 4 OF 6 HCA COPYRIGHT 2004 ACS on STN

92:8439 Displacement reaction for producing NF₄PF₆. Christe, Karl O.; Schack, Carl J. (Rockwell International Corp., USA). U.S. US 4172881 **19791030**, 3 pp. (English). CODEN: USXXAM.
APPLICATION: US 1977-849377 19771107.

AB NH₄PF₆, for use as a solid propellant in **NF₃-F₂ generators** for use in chem. **HF-DF** lasers, is synthesized by mixing PF₅ with NH₄BF₄ at >-196 and warming it to .ltoreq.25.degree. to cause reaction and removal of excess PF₅ and BF₃. Thus, NF₄BF₄ was combined at -196.degree. with a 20-fold excess of PF₅ in a stainless-steel cylinder and the mixt. held at 25.degree. for 64 h. The volatile components were BF₃ and PF₅ and the cryst. residue was NF₄PF₆ contg. no detectable amt. of NF₄BF₄. X-ray powder diffraction data are given for the tetragonal (a 7.577 and c 5.653.ANG.) crystals. Also, IR and Raman spectral data are tabulated.

IC C01B025-10

NCL 423301000

CC 49-8 (Industrial Inorganic Chemicals)

L33 ANSWER 5 OF 6 HCA COPYRIGHT 2004 ACS on STN

91:195401 Inorganic halogen oxidizer research. Christe, K. O. (Rocketdyne Div., Rockwell Int., Canoga Park, CA, USA). Report, RI/RD79-165; Order No. AD-A066149, 665 pp. Avail. NTIS From: Gov. Rep. Announce. Index (U. S.) 1979, 79(16), 189 (English) **1979**.

AB A basic research program in the area of inorg. halogen oxidizers resulted in 91 papers published in major tech. journals, 23 papers presented at international and national meetings, and 14 issued and 4 pending U.S. patents. Major efforts included studies in the areas of **N fluorides**, halogen fluorides and oxyfluorides, perchlorates, novel onium salts, and S fluorides. In the area of **N fluorides**, the most significant breakthrough was achieved in NF₄⁺ salts and synthetic methods developed under this program resulted in NF₄⁺ based solid propellant **NF₃-F₂ gas generators** for chem. **HF-DF** lasers.

CC 50-2 (Propellants and Explosives)

ST rocket halide oxidizer; **nitrogen fluoride** rocket oxidizer

L33 ANSWER 6 OF 6 HCA COPYRIGHT 2004 ACS on STN

86:149828 Synthesis and characterization of bis(tetrafluoroammonium) hexafluorostannate and tetrafluoroammonium pentafluorostannate. Christe, Karl O.; Schack, Carl J.; Wilson, Richard D. (Rocketdyne, Div., Rockwell Int., Canoga Park, CA, USA). Inorganic Chemistry, 16(4), 849-54 (English) **1977**. CODEN: INOCAJ. ISSN: 0020-1669.

AB (NF₄)₂SnF₆ was prepd. by metathesis between Cs₂SnF₆ and NF₄SbF₆ in HF soln. It is a white solid, stable to >200.degree..
Based on its x-ray powder data, it crystallizes in the tetragonal system and is isotypic with (NF₄)₂GeF₆. Its compn. was established by elemental anal. and the presence of tetrahedral NF₄⁺ and octahedral SnF₆²⁻ ions in the solid state and in BrF₅ soln. was demonstrated by vibrational and ¹⁹F NMR spectroscopy, resp. The salt NF₄SnF₅ was obtained in quant. yield from the displacement reaction between equimolar amts. of NF₄BF₄ and SnF₄ in HF soln. When a large excess of NF₄BF₄ was used, the main product was again NF₄SnF₅ and only a small amt. of (NF₄)₂SnF₆ was formed. The NF₄SnF₅ salt was characterized by elemental anal., vibrational and ¹⁹F NMR spectroscopy, and x-ray powder data. The vibrational spectra of the solid and the ¹⁹F NMR spectra of BrF₅ solns. show that SnF₅⁻ possesses a polymeric structure of cis-F-bridged SnF₆ octahedra, analogous to that obsd. for GeF₅⁻ in NF₄GeF₅. The potential of (NF₄)₂SnF₆ for a "self-clinkering" NF₃-F₂ gas generator is briefly discussed.

CC 78-7 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 75